# A Study of the
# Computer Assisted Learning Program
# (CALP)

**Vidya Bhawan Society**

**&**

**Azim Premji Foundation**

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# Foreword

Computer Aided Learning and role of ICT in Education has been a matter of investigation and exploration for many years. There are many divergent points of view about the extent to which these can be useful in an elementary school programme. The Azim Premji Foundation has been a pioneer in looking at the use of computers in schools to help children learn actively. The emphasis of the Foundation is to use this as an aid for the teacher and to supplement what she is able to do. Much before anyone else, the Foundation thought of giving children the opportunity to actively explore concepts through computers. The Premji Foundation began developing programmes that could give children opportunities to engage with concepts and learn. The process of developing these involved many teachers and teacher educators apart from experts in disciplines and in computer pedagogy.

The Foundation also worked towards ensuring that systems in the schools were in order such that children get an opportunity to engage with concepts through visual images. Systems were set up in many different ways across in different kinds of schools and States. These were all in partnership with the State governments.

The present study emerged from the desire of the Foundation which wanted to understand how the system was functioning, how it may be improved and what were the constraints. With this is in mind it initiated the process of reviewing the programme. The present report is an outcome of this endeavour and was jointly undertaken by the Azim Premji Foundation, Dr. Vimla Ramchandran of the Educational Resource Unit and Vidya Bhawan Education Resource Centre.

# List of Abbreviations Used

| | | |
|---|---|---|
| **1** | **BRC** | Block Resource Centre |
| **2** | **BRTE** | Block Resource Teacher Educator |
| **3** | **CAL** | Computer Aided Learning |
| **4** | **CALC** | Computer Aided Learning Centre |
| **5** | **CALP** | Computer Assisted Learning Program |
| **6** | **CD** | Compact Disc |
| **7** | **SSA** | Sarva Shiksha Abhiyan |
| **8** | **YIF** | Young India Fellow |

# A Study of the Computer Assisted Learning Program

## 1.0 Background

The Azim Premji Foundation began the Computer Aided Learning Program (CALP) in 2001. This was in response to the feedback received from parents in rural Karnataka that they would like their children to speak English and learn computers. This intervention took the form of computer centers in 35 schools of Karnataka. These computer centers were called Community Learning Centers and were run by a person, called the Young India Fellow (YIF).

This initiative began as a three-way partnership with a willing head-teacher of a rural government school; with the community, providing basic infrastructure (room, electric cabling etc.) and the Azim Premji Foundation, providing the infrastructure that was needed for the program (computer, furniture and salary of persons involved). There was also a provision, for usage of the computer for revenue generation purposes, by the community, during the evening hours

According to the post audit report and a study done in 2002, CALP was yielding positive results. As a result this year saw importance being given to content creation for CALP. A four-day workshop was organized and teachers were invited to identify topics for software content. A lot of CDs that existed in the market were meant for the western countries or the first world. Besides they were mostly in English or were teacher-centric. It was decided that a package of 100 CDs would be developed, keeping in mind that the content was meant for children and teachers in rural/local settings and should therefore be in local languages.

The Azim Premji Foundation partnership with the government started in 2003 with 55 CAL centers being set up in 11 districts of Karnataka, with the Government providing the computers and Azim Premji Foundation providing the necessary support for implementation. An off-school model was also started in 2004 whereby a school goes to a computer centre called the E-Seva Kendra. In Karnataka the CAL centers were run by the YIF, while in Andhra Pradesh a teacher was responsible for bringing the children to the centers. It was observed that the teachers had unconsciously, started connecting CDs with their lessons.

In the last six years, the program has evolved and grown into a Teacher Assisted Computer Based Learning Program for Children and is being implemented in 15 States/Union territories.

Over the years the Azim Premji Foundation team has collected a lot of information and received feedback about the program. The anecdotal evidence available with Azim Premji Foundation suggests that the CALP has positively impacted attendance, enrolment, community involvement and teacher motivation. It has also contributed in the improvement of non-cognitive skills among children.

In 2006, it was felt that five years of CALP was a reasonable time to systematically look back at the program, take stock and draw lessons for the future.

An extensive research study was planned to comprehensively look at the achievements and constraints for CALP in four selected states– Andhra Pradesh, Tamil Nadu, Karnataka and Uttarakhand with assistance from external experts. This research was expected to provide a sound understanding of the implementation of the program and generate case studies that would help Azim Premji Foundation in determining factors that have been responsible for maximizing the positive impact of the program, and in taking policy decisions related to various dimensions of CALP.

For planning the research study, a meeting of Azim Premji Foundation personnel along with a team of experts took place in April 2006. In this meeting, the broad research areas/questions to be addressed by the study were identified. These were as follows:

- Program objective and design related

- Expectations of children and parents- Is the program able to fulfil them and if so, to what extent?

- Expectations of teachers and the educational administration- Is the program able to fulfil them and if so, to what extent?

- Pedagogy/ learning and content related issues (production and use of CDs, training of facilitators / teachers, integration of CD content in class room teaching);

- Technology related issues (hardware– supply, maintenance, electricity/back-up)

- Location and infrastructure related issues

- Program management and monitoring related issues

- Sustainability issues.

## 2.0    Objectives

Based on these research questions/areas were framed the following objectives:

1. To study the effectiveness of the implementation mechanisms and training strategies in the program.
2. To study the process of delivery in CAL classes and its impact in the classroom.
3. To study the impact of CAL on children, teachers, community and other stakeholders.
4. To study the role of other players like the state government, teachers, schools etc.

## 3.0    Methodology

A combination of techniques and tools were used for data collection. These were:

- Observations
- Focus Group Discussions
- Interviews
- Questionnaire
- Data Perusal
- Self-Completion Scales

## 4.0    Sample Selection

It was decided to include 10 per cent schools from each of the four states in the sample. As Uttarakhand has a much lower number of schools, the percentage of sampled schools was slightly higher here in order to include about 30-35 schools from the state. Further, in order to ensure a proper representation of all the different sub segments/models of CALP that operate in the

different states, it was decided to pick 30-35 schools from each sub segment/model or 10 per cent, whichever is higher.

The sub-segments/models in the states are as follows:

| | Andhra Pradesh | Karnataka | Tamil Nadu | Uttarakhand |
|---|---|---|---|---|
| 1 | 1000 School model of Byraju Foundation | Schools with YIF | CAL centers in BRCs | Schools in hills |
| 2 | E-Seva Kendra in East Godavari district | Schools without YIF | CAL centers within school; both single schools and attached schools | Schools in plains |
| 3 | Other CALC schools both On-Site School and Out-of-School models | | 60 schools in different segments | |
| 4 | Stratified sample (10-15% for each model; about 30-35 E-Seva Kendras) | | | |

The sample was carefully selected to have more On-Site schools, but also sufficient Out- of-School models.

Each sample school was given a unique code based on State, category and model, which was common for all the instruments used for that school. Similarly, unique codes were given to teachers and to CAL Centers.

The final sample for data collection was as follows:

| Sample Size | | | |
|---|---|---|---|
| **Selected states** | **Universe** | **Sample Size** | **Per cent of Universe** |
| Tamil Nadu | 537 | 96 | 18 |
| Andhra Pradesh | 3061 | 206 | 7 |
| Karnataka | 766 | 96 | 13 |
| Uttarakhand | 117 | 40 | 34 |
| **Total** | **4481** | **438** | **10** |

The following list shows the districts selected randomly for the study:

| Karnataka | Andhra Pradesh | Uttarakhand | Tamil Nadu |
|---|---|---|---|
| B'lore Rural | Nellore | Almora | Chennai |
| Shimoga | Cuddapah | Champawat | Madurai |

| Haveri | Adilabad | Uttar Kashi | Sivagangai |
|---|---|---|---|
| Belgaum | Vishakhapatnam- | Pithoragarh | Thiruvallur |
| Bidar | Chittoor | Dehradun | Thiruvannamalai |
| Gulbarga | Medak | Haridwar | Villupuram |
| Chikmagalur | West Godvari | Udhamsingh Nagar | Cuddalore |
| Kodagu | East Godavari | Nainital | Dindigul |

The model-wise sample size for the selected districts in each state is given below:

**Andhra Pradesh: Sample Size**

| Districts | Universe | | | Sample Size | | | |
|---|---|---|---|---|---|---|---|
| | 1000 Schools model | Byraju Foundation | E-Seva Kendra schools | 1000 Schools model | BRF schools | E-Seva Kendra schools | Total sample |
| Nellore | 91 | | | 14 | | | 14 |
| Cuddapah | 206 | | | 20 | | | 20 |
| Adilabad | 111 | | | 16 | | | 16 |
| Vishakapatnam | 99 | | | 14 | | | 14 |
| Chittoor | 257 | | | 20 | | | 20 |
| Medak | 68 | | | 10 | | | 10 |
| West Godavari | 520 | 70 | 87 | 21 | 20 | 35 | 76 |
| East Godavari | 172 | 48 | | 20 | 16 | | 36 |
| Total | 1524 | 118 | 87 | 135 | 36 | 35 | 206 |
| Total Schools in State | 2856 | 118 | 87 | | | | |

**Tamil Nadu: Sample size**

| Districts | Universe Number of schools | | Sample Size | | |
|---|---|---|---|---|---|
| Randomly selected Districts | Off-Schools | On Schools | Off-Schools | On- Schools | Sample Total |
| Chennai | 3 | 10 | 2 | 6 | 8 |
| Madurai | 9 | 16 | 6 | 10 | 16 |
| Sivagangai | 8 | 11 | 5 | 6 | 11 |

| | | | | | |
|---|---|---|---|---|---|
| Thiruvallur | 7 | 13 | 4 | 7 | 11 |
| Thiruvannamalai | 10 | 18 | 6 | 10 | 16 |
| Villupuram | 12 | 14 | 6 | 6 | 12 |
| Cuddalore | 2 | 14 | 1 | 7 | 8 |
| Dindigul | 8 | 16 | 5 | 9 | 14 |
| **Total** | **59** | **112** | **35** | **61** | **96** |
| **Total schools in State** | **140** | **397** | | | |

**Sample Size - Karnataka**

| Districts | Number of Schools | | Sample Size | | |
|---|---|---|---|---|---|
| | **With YIF** | **Without YIF** | **With YIF** | **Without YIF** | **Sample (Total)** |
| B'lore Rural | 10 | 20 | 6 | 8 | 14 |
| Shimoga | 10 | 20 | 6 | 8 | 14 |
| Haveri | 5 | 20 | 3 | 7 | 10 |
| Belgum | 5 | 20 | 3 | 7 | 10 |
| Bidar | 5 | 20 | 3 | 7 | 10 |
| Gulbarga | 5 | 20 | 3 | 7 | 10 |
| Chikmagalur | 10 | 20 | 6 | 8 | 14 |
| Kodagu | 10 | 20 | 6 | 8 | 14 |
| **Total** | **60** | **160** | **36** | **60** | **96** |
| **Total schools in State** | **226** | **540** | | | |

**Sample Size – Uttarakhand**

| Districts | Number of Schools | | |
|---|---|---|---|
| | **Hilly Area** | **Plains Area** | **Sample Size** |
| Almora | 12 | | 5 |
| Champawat | 8 | | 5 |
| Uttar Kashi | 10 | | 5 |

| | | | |
|---|---|---|---|
| Pithoragarh | 8 | | 5 |
| Dehradun | 9 | | 5 |
| Haridwar | | 6 | 4 |
| Udhamsingh Nagar | | 10 | 7 |
| Nainital | | 7 | 4 |
| **Total** | **47** | **23** | **40** |
| **Total schools in State** | 94 | 23 | |

## 5.0    Data Analysis

The following sections analyse the data that was gathered through the tools mentioned above. It presents school profiles, the profile of a CAL Centre, the infrastructure needed to run such centers. It further examines the role of computer aided learning in the classroom situations through observations and discussion with the teachers and children. An attempt to present the types and usage of CDs in the schools has been made.

### 5.1    School Profile

Schools in Karnataka, Andhra Pradesh and Tamil Nadu are well connected by 'pucca' roads and have public transport facilities. However, this is true for only one third of the schools in Uttarakhand. Moreover, most schools of Andhra Pradesh and Tamil Nadu are within 5 kilometres of the main road. This is true for only half of the schools of Karnataka.

While in Andhra Pradesh and Uttarakhand most schools have up to 5 teachers in Karnataka and Tamil Nadu there are upto 11 of them. In Uttarakhand, half the schools and in Tamil Nadu, one-third of the schools have no male teachers.

Schools in Karnataka have substantially more number of rooms than Andhra Pradesh and Uttarakhand. In Karnataka, most schools have 8 to 12 rooms. In Uttarakhand and Andhra Pradesh this number varies from 1 to 7. In Tamil Nadu there is a wide range in the number and in same cases the number is more than 20. The number of classrooms in most schools of Karnataka is 7 and 8, in Uttarakhand 3 and 4 and in Andhra Pradesh up to 5. In Tamil Nadu again data shows a wide range but over a third of the schools have 5 to 8 classrooms. Compared to Andhra Pradesh and Tamil Nadu, there seem to be more rooms than the classrooms in Karnataka and Uttarakhand. In all states, all the rooms are being utilized.

In all the states light seemed adequate in the classrooms. In two-thirds of the schools of Tamil Nadu and in one-fourth of the schools of Uttarakhand and Andhra Pradesh the classrooms are stuffy.

Drinking water facility is sufficient in all the schools of each of these states.

But for one-fourth of the schools in Andhra Pradesh and Tamil Nadu, all schools across all states have toilet facilities. Separate toilet facility for girls and boys is available in two-thirds of the schools in Karnataka, Tamil Nadu and Uttarakhand and a third of the schools in Andhra Pradesh. Data is not available for one-third of the schools in Andhra Pradesh. The toilet facilities are satisfactory in all states except Andhra Pradesh.

Power supply is available in all schools of Uttarakhand, Karnataka and Tamil Nadu. In Andhra Pradesh this is so in just about half the schools.  In over half the schools of Uttarakhand, electric supply is irregular.

Except in Uttarakhand, schools in all states have good library facilities. All schools in Karnataka and Uttarakhand have a play ground, but only two-thirds of the schools of Andhra Pradesh and Tamil Nadu have one.

### 5.2    Computer Aided Learning Centre (CALC) Profile

All Computer Aided Learning Centers are located within the school in Karnataka and Uttarakhand. This is true for half the centers in Tamil Nadu and Andhra Pradesh. In the other cases the centers are located within 2 kilometres of the school.

Most centers of Karnataka and Uttarakhand and half the centers in Andhra Pradesh and Tamil Nadu were started in the year 2000. Most other centers, over all states were started either in 2004 or 2005.

In Karnataka and Tamil Nadu most schools have up to 7 teachers associated with CALP. However in Andhra Pradesh and Uttarakhand this number is 3. The total number of teachers in the schools of Karnataka and Tamil Nadu is higher than those in Andhra Pradesh and Uttarakhand. Thus the ratio of teachers associated with CALP and the total number of teachers is the same for all four states. More than half the centers of Andhra Pradesh do not have any teacher associated with CALP.

In Uttarakhand and in two-thirds of the centers in Karnataka, the CAL in-charge is a teacher of the school. This is true for only a third of the centers in Tamil Nadu and Andhra Pradesh. In the rest of the centers in Karnataka and Andhra Pradesh s/he is the Young India Fellow (YIF) and in Tamil Nadu s/he is the YIF or the Block Resource Teacher Educator (BRTE).

According to the head teachers of one-third of the centers of Andhra Pradesh, one -fourth of the centers of Karnataka and a fifth of the centers of Tamil Nadu and Uttarakhand, CAL centers are not functioning.

## 5.3    General Infrastructure at the centre

Drinking water facility is 'sufficient or somewhat sufficient' in all centers, in all states except for one fifth of the centers in Tamil Nadu and Uttarakhand.

All centers across all states have toilet facilities except for a fourth of the centers in Tamil Nadu and Andhra Pradesh. Separate toilet facility for girls and boys is available in two-thirds of the schools of Karnataka, Tamil Nadu and Uttarakhand and a third of Andhra Pradesh. Data is not available for a third of the centers in Andhra Pradesh. Children in most centers of Tamil Nadu and Uttarakhand and half the centers of Andhra Pradesh are using toilet facilities. Data is not available for Karnataka and half the centers of Andhra Pradesh.

The CAL room is 'very clean or somewhat clean' in centers over all states. It is cleaned once a day or once in two days in most centers across all states. However, in one-fourth of the centers in Tamil Nadu and Uttarakhand it is cleaned once a week. In two-thirds of the centers of all states 'all or most of the components' of the computer are dusted. In most centers of Karnataka, two-third of Uttarakhand and half of Andhra Pradesh and Tamil Nadu these are dusted once a day or once in two days. In a third of the centers in Tamil Nadu and a fourth of the centers in Uttarakhand components of the computers are dusted once a week.

Most centers of Tamil Nadu have up to two fans and most of the centers in Andhra Pradesh have up to four fans. Half the centers of Karnataka and Uttarakhand have around two fans and for the other half, data is not available.

## 5.4    Infrastructure required for Computer Aided Learning

In CAL centers within all states, electrical fittings and connections have been properly installed and are safe. Electrical wiring is covered, switches and sockets are properly fitted onto the switchboard, and the switchboard is properly fitted onto the wall. No plugs, switches and sockets are broken. No wires have been directly put into sockets without plugs. Electrical connections are earthed and all fittings are safe.

Most centers of Uttarakhand have 2 computers; Tamil Nadu has 4 computers and Karnataka has 2 to 5 computers. In Andhra Pradesh there is great variation and the number goes up to 54. The

numbers of working computers in most centers in Uttarakhand is 2, in Tamil Nadu it is 4, in Karnataka it varies between 2 and 5 while Andhra Pradesh shows great variation. The number of tables in most centers in all states follows a similar trend. The equation between the number of computers available and the number of tables is further corroborated by the fact that in most centers across all states, one computer is placed on one table.

Power supply is available at all centers but fewer centers of Andhra Pradesh and Uttarakhand have regular power supply as compared to Karnataka and Tamil Nadu.

In most centers of Karnataka and Uttarakhand and in two-thirds of the centers of Andhra Pradesh, it takes less than 5 minutes to start viewing CDs. In the rest of the centers in Andhra Pradesh it takes between 5 and 10 minutes. In two-third centers of Tamil Nadu it takes more than 15 minutes to start viewing CDs and in the rest between 10 and 15 minutes.

Computers in a third of the centers in Karnataka and Uttarakhand and a fifth of the centers in Andhra Pradesh have no power backup. Half the centers of Tamil Nadu have a 30-minute backup and the rest have less than 30 minutes. A third of the centers of Uttarakhand have up to a 20-minute power back and a fifth of the centers of Andhra Pradesh have power backup of up to 10, 20 and 30 minutes each. There is a wide scatter in case of Karnataka; the time for power backup goes up to 6 hours.

In most centers of Uttarakhand and Karnataka, chairs are available for sitting with the computer; however, this is true for only two-third centers of Andhra Pradesh. In Tamil Nadu, stools and not chairs are available for two-third centers.

In two-third centers of Tamil Nadu, half of Karnataka and one-third of Uttarakhand and Andhra Pradesh, children sit while using the computer. In the rest of the centers 'some children' stand while using the computer. Data is unavailable for half the centers of Andhra Pradesh and a third of Karnataka. In Tamil Nadu most centers have 5 to 10 children on a computer and in Uttarakhand there are 2 to 5 children on one computer. In Karnataka and Andhra Pradesh, this data is not available for the centers and the rest shows wide scatter, the number of children going up to 62.

Sufficient sitting space per child is available for children in most centers of Tamil Nadu, in two-third centers of Uttarakhand but only in one-third of the centers of Andhra Pradesh and Karnataka. In two-third of the centers Uttarakhand, Tamil Nadu and Andhra Pradesh children can access the keyboard and mouse. This is true for three-fourth of the centers of Karnataka.

There is a wide scatter in the total number of CDs available in centers over all states, the number going up to 130 in Andhra Pradesh and Karnataka and about half of this in Uttarakhand and Tamil Nadu. In Tamil Nadu two-third of the centers has 60-62 CDs and half the centers in Karnataka have 25-26 CDs.

The subject-wise break-up of the number of CDs is available for three-fourth of the centers of Karnataka, Tamil Nadu and Uttarakhand and half the centers of Andhra Pradesh. The average number of Mathematics CDs over the four states varies between 12 and 19, the lowest being in Karnataka and the highest in Tamil Nadu. The average number of Science/Social Science/EVS (only Science in case of Tamil Nadu) CDs over the four states varies between 13 and 17- the lowest is in Karnataka and the highest in Tamil Nadu. The average number of Language CDs is fewer. It varies between 5 and 8 with the lowest in Uttarakhand and the highest in Karnataka. The average number of English CDs is the lowest. It varies between 2 and 8, the lowest being in Uttarakhand and the highest in Tamil Nadu.

In most centers of Tamil Nadu 1 to 5 CDs are not working. This is also the case with two-thirds of the centers of Karnataka and Uttarakhand. In Andhra Pradesh, this number goes up to 21.

In most centers of Tamil Nadu, two-thirds of Uttarakhand and Karnataka and half of Andhra Pradesh, CDs are copied onto the hard disk. However data for this is not available for most centers of Andhra Pradesh, half the centers of Karnataka and Uttarakhand and one-third centers of Tamil Nadu. Moreover, the number of CDs copied varies considerably (between 1 and 92) in all states.

In two-third centers of Tamil Nadu, half of Uttarakhand and one third of Andhra Pradesh and Karnataka, CDs are copied to the hard disk subject wise. Data for half the centers of Andhra Pradesh and Karnataka and one third of Uttarakhand is not available.

## 5.5    Computer and Technology

Teachers, head teachers, CAL in-charges or YIFs, all feel that technology has impacted the overall lifestyle in the country. All of them mention 'computers and internet', and 'communication devices' as recent technological innovations. All have further stated that computers are useful for 'official and administrative work', in the 'services sector' and for 'communication purposes' in daily life.

Teachers from all states feel that computers and technology are essential in today's classrooms and that technology is not just meant for private schools. At the same time, teachers across all states feel that computers do not decrease the role of teachers in classroom process. Teachers, head teachers, CAL incharges and YIFs find use for computers in school in the 'teaching-learning process', as a 'teaching aid' and for 'official and administrative work'.

They feel that the computer is a sophisticated device that requires careful handling and high maintenance but does not create a problem in classroom management. Teachers of Andhra Pradesh, Tamil Nadu and Uttarakhand feel technology aided learning is not a time consuming process, but this is not true for more than half the teachers of Karnataka.

As a downside, one-third teachers across all states feel that exposure to computers causes health hazards. For example more than half the teachers of Tamil Nadu and Uttarakhand and more than a third of the teachers of Karnataka and Andhra Pradesh feel that children's eyesight gets affected by watching CDs.

## 5.6    CDs and child learning

According to head teachers across all states the objective of CDs is learning. Teachers and YIFs across all states feel that children are interested in learning subject matter through CDs and are, actually learning and understanding through the CDs. During CAL session observations, it was observed that children in all states are taking interest in CDs.

Teachers over all states feel that once children watch the CD they learn the content. Half the teachers of Karnataka and Tamil Nadu and a third of Andhra Pradesh and Uttarakhand feel that children can learn more content in lesser time using CDs.

Teachers feel that CDs promote self-learning and self-evaluation and they should include items for self-evaluation of the learner. CDs also help children enhance their communication skills and encourage peer learning. At the same time, CDs help slow learners improve their learning.

Teachers across all states feel that CDs not only increase a child's concentration but also her creativity and imagination too. They build a scientific temperament among children and help them in recapitulation. Most teachers of Karnataka and Tamil Nadu and two-thirds of Andhra Pradesh and Uttarakhand feel that the achievement levels of children have improved due to CDs.

Teachers feel that the colour and animation of CDs make them attractive and enhance a child's interest in them. YIFs further feel that CDs are effective because they employ the play-way method and are related to the syllabus. Head teachers feel that they help in understanding difficult concepts.

## 5.7    CDs and subject matter

Teachers and YIFs over all states feel that CDs enhance subject matter learning but they have not given any specific reasons for this, except to say that CDs employ the play way method, are easy to learn, generate interest among children and are related to the syllabus. They also feel that the CDs are relevant to syllabus, though there is less agreement on this in Uttarakhand. At the same time, teachers of Andhra Pradesh and Tamil Nadu and a third of Uttarakhand feel that CDs do not cover all syllabus areas.

Teachers over all states except a third in Andhra Pradesh and Uttarakhand feel that examples used in CDs are relevant. It is again teachers of Andhra Pradesh and Uttarakhand who feel that examples given in CDs are not based on the textbook. A third of the YIFs of Tamil Nadu also feel the same way.

Teachers of all states except, two-thirds of Uttarakhand feel that CDs bring new knowledge to them. At the same time most teachers of Andhra Pradesh, two-thirds of Karnataka, half of Tamil Nadu and a third of Uttarakhand feel that CDs are for entertainment value.

Teachers of Karnataka, Tamil Nadu and Uttarakhand feel that all subject CDs are useful, however only half the teachers of Andhra Pradesh agree with this. Moreover only half the teachers of Karnataka and Uttarakhand and one-third of Tamil Nadu and Andhra Pradesh want to teach all subjects through CDs.

Many more teachers of Karnataka and Uttarakhand than Tamil Nadu and Andhra Pradesh feel that CDs are more effective than a textbook. In fact two-thirds of the head teachers of Uttarakhand feel that there is no difference between a CD and a textbook. However head teachers of the other three states see the difference in the form of use of 'play-way method' and 'preparation of TLM'. Teachers over all states feel that CDs cannot replace textbooks.

It seems that while the teachers see the role that CDs can play in classroom transaction, there is disagreement on the content of the CD and its relevance. The only agreement is that CDs can at best be a good supplement to textbooks but not its replacement.

## 5.8    Subject CDs

There is a complete disinterest or lack of knowledge among teachers of Andhra Pradesh about CDs. They have mostly not responded to any questions regarding CDs – number of CDs available, subject-wise break-up of CDs; preferred subject CDs; which CDs do they like or dislike; which they feel are more or less effective for children.

On the other hand teachers of Karnataka seem to know their CDs. It is only in Karnataka that teachers have mentioned names of individual CDs that they or the children like or dislike.

Teachers and head teachers of Karnataka, Tamil Nadu and Uttarakhand show preference for Mathematics and Science CDs followed by Language CDs. For teachers of Karnataka language CDs is also a prominent choice.  YIFs have not reflected upon their choice in CDs.

## 5.9     CDs and classroom teaching

Teachers, head teachers, CAL incharges and YIFs, all feel that there has been change in teaching-learning process and teaching methods in school because of CALP. However, they have mostly not been able to say what these changes are. Some have mentioned use of 'play-way method' and 'preparation of TLM' as the changes. Moreover, all of them have not been able to say why these changes were necessary. **This seems to indicate that the teachers have not actually used the CDs as an active tool or aid while teaching. Their earlier observations seemed to suggest that they were giving expected responses rather than a considered view.**

**Teachers over all states feel that classroom teaching does not get diluted due to CALP and neither are learning opportunities reduced due to CALP**. Head teachers over all states feel that CDs help teachers in the 'teaching learning process' and by 'reducing their workload'. However, teachers over all states feel that they have to give additional time due to CALP.

Two-thirds of the teachers of Tamil Nadu and Uttarakhand and half the teachers of Andhra Pradesh have no problem in linking classroom teaching to CAL classes as they say that they show the CDs to children after lesson teaching. Those teachers, who do have problems, have them due to 'lack of time'. Teachers of Karnataka have not responded to this question.

Most teachers of Uttarakhand, two-third teachers of Karnataka and Tamil Nadu and one-third of Andhra Pradesh feel that CDs are more effective than classroom teaching. However, a third of the teachers in all states feel that a systematic approach is not possible in learning through CDs.

## 5.10    CDs as TLM

Most teachers of Karnataka and Tamil Nadu and two-thirds of Andhra Pradesh and Uttarakhand feel that CDs help teachers in preparing teaching-learning material. However only a third of Karnataka, half of Andhra Pradesh and Tamil Nadu but two-thirds of Uttarakhand say that their friends believe that there is no other TLM as good as the CD.

## 5.11    Problems in usage of CDs

Except for half the YIFs of Uttarakhand, most teachers and YIFs do not seem to have any difficulty in using CDs. Teachers and YIFs of Andhra Pradesh have not responded to this question.

In case of problems teachers of Karnataka have said that they look up the manual and teachers of Uttarakhand say they take help from teachers of other schools. YIFs have not responded to this question.

## 5.12    Children's Interest and Interactions in CALP

### 5.12.1  Children's Interest

According to teachers over all states CALP promotes joyful learning. During CAL session observations, children in all states, except for a third of the centers in Karnataka, were seen enjoying themselves. Moreover, children in all states appeared involved in CDs and seem to understand what they are doing. Teachers and YIFs over all states also state that children are leaning subject matter from CDs. They confirm this by 'asking children questions about the

subject matter' and judging from the 'interest that they show in the CDs'. However, YIFs feel that only a few children understand while interacting with CDs.

According to teachers, students like to keep viewing CDs and wait for the CAL period. In Uttarakhand and Tamil Nadu children do not leave their seats as soon as the period is over. In fact they have to be told to leave after the period is over. About two-thirds of the teachers of Uttarakhand and Tamil Nadu, half of Karnataka and a third of Andhra Pradesh feel that frequent use of computers can make children addicts.

Teachers across all the states feel that the children get an opportunity for self learning through CDs. It was however observed that children in all the states reached conclusions through the trial and error method for solving problems. YIFs of Karnataka and Tamil Nadu and half of Andhra Pradesh also agree that children reach conclusions through this method.

 As seen in CAL session observations over all states, some children are seen interacting with computers while rest look at it. At the same time, children viewing teacher demonstration is common in only a third of the centers in Andhra Pradesh, Karnataka and Uttarakhand but uncommon in Tamil Nadu.

### 5.12.2  Children's Interactions

A positive relationship among children and between children and their teacher is observed during CAL sessions.

Peer Group Learning is seen during CAL session observations in all states with children taking help from their friends to understand content. Teachers over all states feel that CDs enhance peer learning. YIFs in most centers of Karnataka and Tamil Nadu and two-thirds of Andhra Pradesh state that children cooperate with each other and take help from their friends for understanding CD material.

A positive relationship is also seen between the teacher and students during CAL sessions. In all the States children do not hesitate in asking the teachers questions. In turn, the teacher deals with these questions, patiently and does not reprimand or hit children. Moreover, teachers give space to children to discuss freely in groups. According to most teachers of Karnataka and Uttarakhand and half of Andhra Pradesh, children take help from them during CAL sessions and in a fifth of the cases in Andhra Pradesh and Uttarakhand, from the CAL incharge.

Children in Uttarakhand and Karnataka are seen to be more confident in handling technology than those of Andhra Pradesh and Tamil Nadu. Many more children in Uttarakhand and Karnataka are able to start the program, use the mouse, open folders, put and change CDs and also navigate them. At the same time children are found to need guidance in doing so, in all states. Most teachers also feel that computers cannot be handled by students without the help of teachers.

Except for in Andhra Pradesh, children in more than half the centers over all three states are seen switching on the computers. This is true for most centers in Uttarakhand. Moreover, children in most centers of Uttarakhand and Tamil Nadu and half the centers of Karnataka are seen selecting CDs to be used.

Teachers over all states feel that CALP addresses issues of equity but at the same time half of the teachers in Karnataka, Uttarakhand and Tamil Nadu and three-fourths in Andhra Pradesh feel that all children are not capable of learning from CDs.

Teachers over all states, state that computers are not meant for boys only. All the YIFs of Karnataka and two thirds of Andhra Pradesh and Tamil Nadu say that boys and girls work in the same group.

In Uttarakhand and Tamil Nadu this is observed to be true during CAL session observations, with both boys and girls interacting with computers. However, in Karnataka and Andhra Pradesh both 'only boys' and 'only girls' are found to be interacting with computers in two-third and one-third cases respectively. However, wherever the situation arose, boys and girls are seen to be working in the same group and at the same time in almost all centers of Karnataka, about half of Tamil Nadu and Andhra Pradesh but only one third of Uttarakhand.

Except for a fourth of the teachers of Tamil Nadu, teachers over all states do not feel that children belonging to higher income families are the only ones who can handle computers. Teachers of all states also state that technology is not just for children of private schools. However, most teachers of Andhra Pradesh and Uttarakhand feel that computers are really useful for bright children.

According to YIFs physically challenged children are present in two third centers of Karnataka and a third of the centers in Tamil Nadu and are made part of CAL sessions.

## 5.13    Role of staff associated with CALP

As observed in CAL session observations, in Tamil Nadu, Andhra Pradesh and Karnataka, the class teacher is present in CAL session 'full time'. However, in Uttarakhand, the class teacher is only present in two-third of the centers. Moreover, she is present 'full time' in only two-third of the cases.

In all states, the class teacher is seen providing guidance to children, whenever they ask for it. In Karnataka and Uttarakhand, the class teacher is observed 'moving about the groups of children' and in Tamil Nadu, 'sitting with one group'. In Andhra Pradesh, the teacher is 'seen moving around groups of children', 'sitting with only one group' and also 'sitting at a place away from children'.

Most teachers of Karnataka and Uttarakhand also feel that their role is to 'provide guidance'. However this is true for only a third of the cases in Andhra Pradesh and Tamil Nadu where teachers also feel that their role includes 'to teach children' and 'to run CAL centre'.

According to teachers of all states, all children must get an opportunity to use the computer even in a group. CAL session observations tell us that all teachers in Uttarakhand ensure that each child gets approximately equal time, but this was seen only in half the centers on Tamil Nadu, Andhra Pradesh and Karnataka.

Two-third teachers of Uttarakhand as compared to one-third of all the other states, say that they ensure that each child gets an equal chance with the computer by 'division in groups'. Another way of ensuring that each child gets an equal chance as stated by teachers of all states is by 'following the time table'.

CAL session observations tell us that the CAL incharge is present in half the centers of Karnataka and Tamil Nadu about one-third centers of Uttarakhand and Andhra Pradesh. In Andhra Pradesh, Karnataka and Uttarakhand the CAL incharge was present 'full time or most of the time' however, this was true for only half of the centers of Tamil Nadu.

Most CAL incharges feel that their role is to 'provide guidance' to children and some feel that it is 'to run the program'. The CAL incharge in turn is seen providing guidance to children, mostly when they ask for it. CAL session observations further tell us, that in half the centers of

Uttarakhand and Andhra Pradesh the CAL incharge was 'moving around in groups' and in rest of the cases either 'sitting with only one group' or 'sitting at a place far away from the children'. In centers of Karnataka, where the CAL incharge was present he was 'moving around in groups' and in Tamil Nadu he was 'sitting with one group'.

In Uttarakhand, the CAL incharge was seen trying to ensure that each child sets approximately equal time. However, this is true for two-thirds of the centers in Andhra Pradesh and one-third in Karnataka and Tamil Nadu.

It is the CAL incharges of Karnataka and Andhra Pradesh who state that they ensure that each child gets approximately equal time on the computer by their 'division into groups' and by 'following the time table'. Most CAL incharges of the other two states have not responded to the question. However, only about a third of the CAL incharges over all States feel that children get enough time on the computer. Moreover teachers of Tamil Nadu and Uttarakhand feel that only a few students have seen a CD in full but this is not the case in the other two states.

YIFs feel that the teacher's role is to take children to CAL classes and act as a guide. Most YIFs of Karnataka, two-thirds of Andhra Pradesh and half of Tamil Nadu say that a teacher accompanies children to CAL sessions. Only half the YIFs of Karnataka and Andhra Pradesh have responded to how they ensure that each child gets equal time on the computer –division in groups and by following the time table.

Teachers, CAL incharges and YIFs feel that a head teacher's role includes supervising the program, providing guidance and helping them in preparation of the timetable.

During CAL sessions work other than CAL, happens in a fifth of the centers of Andhra Pradesh and Tamil Nadu. Here other work includes, work of other programs or other classes. Data is not available for a third of the centers of Andhra Pradesh and a fourth of Karnataka.

## 5.14    Place for CALP in the school time-table

CAL session observations tell us that there seems to be no fixed time for CAL periods, during the day. Moreover, the number of periods per child, per week does not seem to be fixed. Most centers of Tamil Nadu and Karnataka and a third of the centers of Uttarakhand and Andhra Pradesh have 40 or 45-minute periods. Half the centers of Uttarakhand have 35-minute periods and one-fourth in Andhra Pradesh have an hour-long periods. Children use CAL classes beyond the time-table in half the centers of Uttarakhand and one-fifth of the centers in the other three states. **This is a very important finding; it indicates that effectively CAL is an add-on and not an integral part of the teaching-learning process. This also helps to explain why both teachers and children interact differently during CAL periods**.

In most centers over all states, computers were not switched on when children came in. Keeping in mind that computers take some time to start, this seems both a waste of teaching time in CAL sessions and also points to the fact that regular school time table does not have periodic CAL sessions.

However, most YIFs of Karnataka, two thirds of Andhra Pradesh and a fourth of Tamil Nadu feel that CAL sessions are incorporated in the regular timetable. They also feel that head teachers should help them in organising the time-table to incorporate CAL sessions.

Most teachers feel that time allotted for CAL sessions is not enough .A prominent reason given for this is that one CD cannot be 'taught' or 'explained' in one period. Some other reasons given for this are that the 'strength of the students' and 'the presence of poor students'.

Most teachers over all states especially in Tamil Nadu feel that they have to give extra time for CALP. Most YIFs of Karnataka, two-thirds of Andhra Pradesh and half of Tamil Nadu say that they prepare for CAL sessions both 'during school hours' and 'before school hours'. However many YIFs have not responded to this question.

## 5.15 Training of school staff for CALP

Most teachers associated with CALP, in all four states have received training for facilitating computer aided learning sessions. However, it is interesting to note that in half the centers of Andhra Pradesh there is no teacher associated with CALP

Teachers of all states agree that they need training for the CALP and further reiterate this by saying that their friends handling the program also want training.

Most teachers said that they have received trainings for CALP however, felt that it was insufficient. Most teachers of Karnataka and Uttarakhand, half of Tamil Nadu and one third of Andhra Pradesh feel that this is because trainings are not long enough. Teachers also feel that trainings should be more enjoyable. At the same time teachers of Uttarakhand and Andhra Pradesh and about a third of the teachers in Karnataka and Tamil Nadu were not able to say if the trainings were very different from the other trainings that they have previously received.

Most YIFs of Karnataka and Tamil Nadu and two-thirds of Andhra Pradesh said that they had got training for CALP. Half the YIFs of Andhra Pradesh and Tamil Nadu feel that the training is sufficient, while this is true for only a fourth of the YIFs of Karnataka.

Two-thirds of the teachers in all states feel that training should be given only to people who handle the program. However teachers of all states, except Andhra Pradesh, feel that, training is also required for the head teacher.

Two-thirds of the head teachers of Karnataka and Tamil Nadu and a third of Andhra Pradesh and Uttarakhand state that they have not received training under CALP. Head teachers who have received training feel that the main components of the training are- 'reduce teacher's work' and 'CD operation and viewing' but most head teachers have not responded to this question. Head teachers in Tamil Nadu, Uttarakhand and Karnataka state that they did not find the training adequate and most head teachers of Andhra Pradesh did not respond to the question.

## 5.16 Head teacher involvement with CALP

Most head teachers over all states do not seem to be aware of when CALP started in their schools. More than half in all states have stated that CALP started in their schools in 2004 or 2005.

The most prominent reason given by head teachers of Andhra Pradesh, Karnataka and Uttarakhand for their school being chosen for CALP was the 'availability of infrastructure'. This was followed by less prominent reasons like 'student strength' and the 'presence of poor students'.

However, head teachers over all states do not seem to know what the role of the CALP teacher is. Some state their role to be 'supervisory', some feel it is a 'support role', some say it is 'to teach' while some others say it is 'to deliver computer knowledge'. At the same time, head teachers in all states feel that an extra person is needed to coordinate CALP.

Most head teachers of Andhra Pradesh and half of Tamil Nadu are aware that there is an extra person to coordinate CAL in their schools. However head teachers of Andhra Pradesh seem confused about whether this extra person is the BRTE, or someone from SSA or someone from

some private organization. In Tamil Nadu head teachers state that the extra person is the BRTE. Moreover, head teachers of Karnataka and Uttarakhand (where no extra person is present) state that an extra person is required to coordinate CALP however, are not able to give any reasons for saying so.

There is also confusion in the number of CDs present in the school and there is a wide variation in the response on the total number of CDs mentioned by head teachers of each state. In Andhra Pradesh the number goes upto 150, in Karnataka and Tamil Nadu upto 100 and in Uttarakhand upto 60. Half the head teachers of Karnataka say that their school has 25-26 CD'; one third of Tamil Nadu say 62 CDs; one-third of Uttarakhand say 35-42 CDs and in Andhra Pradesh this data shows great scatter. Half the teachers of Tamil Nadu and one fourth of Andhra Pradesh have not responded to the question.

Head teachers over all states say that they have seen CDs on the computer. The number of CDs seen by them goes upto 62 but most head teachers have seen upto 10 CDs. A third of the head teachers in Uttarakhand have seen upto 20 CDs and a fourth in Karnataka have seen upto 30 CDs. Half the head teachers of Andhra Pradesh and a third of them in Tamil Nadu and Uttarakhand have not responded to this question.

Head teachers over all states prefer Mathematics and Science CDs in comparison to other subjects. In addition to this, teachers of Karnataka show a preference for Language CDs too. Two-thirds of the head teachers of Andhra Pradesh and Tamil Nadu and one third of Uttarakhand and Karnataka have not responded to this question.

Head teachers of Karnataka and Uttarakhand have said that they are not able to watch any CD as they are 'occupied with school work' however teachers of Andhra Pradesh and Tamil Nadu have given no reasons.

Head teachers over all states say that 'division of groups' and 'following the time table' are ways by which they ensure that each child gets equal opportunity with the computer, however only a third of the head teachers of Andhra Pradesh and Karnataka, half of Tamil Nadu and two-thirds of Uttarakhand have responded to the question.

According to head teachers of Tamil Nadu and Uttarakhand, 'taking attendance', 'regular supervision' and 'grouping of children' are some of the ways used to ensure that children attend CAL regularly. Head teachers of Andhra Pradesh and Tamil Nadu have either not responded to this question or have said that they have made no efforts.

Only a third of the head teachers over all states say that they have received the manual for CAL. Those who have received the manual either don't know who gave them the manual or named various sources like SSA, Block office, DEO, Azim Premji Foundation Coordinator, private organizations like NIIT, Intel etc. Moreover the manual seems largely unused by head teachers over all states except teachers of Karnataka, where two-third head teachers have given it to the teachers in comparison to the one third in all other states.

Head teachers over all states are not clear about who is responsible for repair and maintenance in CALP. Answers include BRC officials, private agencies and collection from parents. Head teachers over all states except Karnataka are also not clear about whose responsibility payment of electricity bill is, either.

### 5.17    Stakeholder Responses to CALP

Two-third teachers over all states feel that community participation has increased due to CALP. However two-third head teachers of Karnataka and Uttarakhand and half of Andhra Pradesh and Tamil Nadu feel that they get no support from the community for CALP.

Head teachers over all states feel that parents think that CALP is a good program and a third of the head teachers Uttarakhand also feel that parents take interest in the program. Teachers in Uttarakhand, say that parents feel that learning through CDs is a better method of teaching however the agreement is lower in the other three states, the lowest being in Tamil Nadu where only a third of the teachers say this.

Most head teachers of Karnataka, Tamil Nadu and Andhra Pradesh do not find support provided by Azim Premji Foundation adequate and most head teachers of Uttarakhand did not respond to the question. Only a third head teachers of Karnataka and Uttarakhand feel that they have got sufficient guidelines for CALP and those of Andhra Pradesh and Tamil Nadu have not responded to the question.

Teachers, YIFs, CAL incharges and head teachers over all states feel that CALP helps in children learning. Teachers over all states further feel that CALP introduces technology to children at the right age and leads to the holistic development of children. Children become more creative and confident because of it. It promotes joyful learning as there is no pressure on the child and he can learn according to his choice. Teachers further state that they feel pride when among their peers, as they teach through computers. This statement does however contradict the way CAL is positioned in school, e.g. it is not on the time table but is treated as an add-on subject. It can be the subject of further research.

Head teachers feel that the money provided for TLM is adequate. Most YIFs of Karnataka and Tamil Nadu and two-thirds of Andhra Pradesh feel that CALP is functioning upto expectation and a fifth in all the three states feel that it is functioning very well.

### 5.18    Impact of CALP

All teachers state that they have made changes in their teaching methods due to CALP, but have not been able to say what these changes are. Head teachers over all states also feel that there have been changes in teaching methods due to CALP but like teachers are not very reflective on what these changes are, stating that 'children learn better' due to CAL and 'teacher work load is reduced'.

All head teachers feel that schools have changed after CALP.  The changes that they have mentioned, in the order of preference are- improvement in interest, improvement in attendance and facilitation of the teaching-learning process. They also state that CALP has bought about changes in teaching methods due to use of 'play way method' and 'preparation of TLM', however half the head teachers of Karnataka, Tamil Nadu and Andhra Pradesh have not responded to the question.

Most YIFs of Karnataka and a fourth of them from Andhra Pradesh and Tamil Nadu say that they have made changes in regular classes due to CALP. However they were not able to say why these changes are necessary.

As noted in CAL session observations children in half the centers in all states make disturbing noise and in a third of the centers of Karnataka and Uttarakhand 'many children' are observed to do so. Teachers over all states except Andhra Pradesh feel that CAL disturbs classes. According

to half the YIFs of Tamil Nadu and one-third of Andhra Pradesh and Karnataka, children do make disturbing noise in CAL sessions, however only a few do so.

Teachers over all states feel that CALP has increased regular attendance. This agreement is a little lower for Andhra Pradesh. Two-third teachers over all states feel that CAL has positively impacted dropout however the agreement is lower for Karnataka. Half the YIFs in Karnataka, Andhra Pradesh and Tamil Nadu feel that CALP makes children more regular and the other half has not responded to this question. Most head teachers over all 4 states except half in Tamil Nadu feel that CAL has improved regular attendance and that children present themselves on CALP workdays.

Two-third head teachers of Uttarakhand and half of Andhra Pradesh state that CALP brings additional burden on the school, but don't give reasons for this. Only a third of the YIFs in Andhra Pradesh feel this way. One-third head teachers of Karnataka and Uttarakhand feel that CALP creates a problem of space. Most head teachers of Andhra Pradesh and Tamil Nadu did not respond to the question.

## 5.19    Suggestions for improvement of CALP

Teachers, head teachers and YIFs, feel that the main problem ailing CALP is infrastructure and looking for solutions on issues like lack of computers, UPS, erratic power supply can go a long way. Other reasons given for CALP not functioning well are inadequate training and lack of supervision. Their suggested solutions to these problems are improvement in trainings and appointment of a special teacher for CALP.

## 5.20    Performance rating of CAL Centers:

In order to understand the functioning of the Centre from the data that has been gathered, 11 parameters were delineated keeping in mind aspects related to infrastructure, functioning, and available human resources. The parameters were identified by the research team of the Azim Premji Foundation. All the centers investigated were categorised as 'functioning well', 'average functioning', 'relatively poor functioning' and 'not functioning' based on their performance. CAL Centers that were identified as

> **Parameters for the functioning of the centers**
>
> 1. CALC is functioning for appropriate classes i.e. class I to V in Andhra Pradesh, Tamil Nadu and Karnataka and V and VII in Uttarakhand.
> 2. Number of children per computer is 5 or less.
> 3. Children can handle computers themselves.
> 4. Teacher(s) is present in CALC.
> 5. Teacher(s) is actively involved in CALC.
> 6. Children actively participate in exploring the CD's
> 7. 80 per cent or more children get an opportunity to use the computer.
> 8. Actual time to view CD's is at least 35 minutes.
> 9. Attendance in class is at least 80 per cent.
> 10. At least 80 per cent of the computers are working.
> 11. At least 80 per cent of the computers are in use.

'functioning well' have been able to satisfy 9-11 of these parameters; those showing 'average functioning' have been able to satisfy 5-8 of these parameters and those showing 'relatively poor functioning' have been able to satisfy 2-4 of the parameters.

The performance of the institution takes into account the usage pattern of the computers in the CALC. This means that the functioning takes into account whether or not the CALC is able to function, whether or not the children are being helped by the teacher to use the computer and the overall functioning of the centre.

**Table: Percentage of Functioning Schools -Model-wise**

| State/Model | Number of schools | Functioning | | | | |
|---|---|---|---|---|---|---|
| | | Well | Average | Poor | Total | |
| **Andhra Pradesh** | | | | | | |
| 1.  Other schools (1000 schools model) | 135 | 7.41 | 31.11 | 0.74 | 39.26 | 60.74 |
| 2.  Byraju Foundation | 36 | 5.56 | 47.22 | 0 | 52.78 | 47.22 |
| 3.  E-Seva Kendras - schools | 35 | 0 | 37.14 | 2.86 | 2.86 | 97.14 |
| **Karnataka** | | | | | | |
| 1.  CALC- with  YIF | 36 | 13.89 | 47.22 | 5.56 | 66.67 | 33.33 |
| 2.  CALC- without YIF | 60 | 3.33 | 30 | 11.67 | 45 | 55 |
| **Tamil Nadu** | | | | | | |
| 1. On-school | 61 | 6.56 | 45.9 | 6.56 | 59.02 | 40.98 |
| 2. Off-school | 35 | 5.71 | 31.43 | 11.43 | 48.57 | 51.43 |
| **Uttarakhand** | | | | | | |
| 1. Hilly Area | 25 | 8 | 12 | 4 | 24 | 76 |
| 2. plains | 15 | 0 | 60 | 6.67 | 66.67 | 33.33 |

**Table: Schools and Performance Parameters**

| Satisfactory indicators | Number of schools in | | | | |
|---|---|---|---|---|---|
| | Andhra Pradesh | Karnataka | Tamil Nadu | Uttarakhand | Total |
| 11 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 3 | 1 | 0 | 4 |
| 9 | 12 | 4 | 5 | 2 | 23 |
| 8 | 13 | 10 | 6 | 6 | 35 |
| 7 | 21 | 11 | 12 | 1 | 45 |
| 6 | 27 | 9 | 14 | 3 | 53 |
| 5 | 11 | 5 | 7 | 2 | 25 |
| 4 | 2 | 7 | 4 | 1 | 14 |
| 3 | 0 | 1 | 4 | 0 | 5 |
| 2 | 0 | 1 | 0 | 1 | 2 |
| **TOTAL** | **86** | **51** | **53** | **16** | **206** |

**The tables above indicate that the functioning of the CALC in most of the states and in most of the categories is not what is expected. In all the states and almost all the categories, more than half the CALCs are not functioning and among those that were functioning majority are average or poor. The program seems to function best in schools in Karnataka with a YIF, where 66.6 per cent of the schools had functional CALCs. Similarly, 66.6 per cent of the schools in the plains in Uttarakhand were functional. The data indicates that the performance of the CALCs in Andhra Pradesh, Tamil Nadu and the hilly areas of Utttarakhand is a matter of particular concern.**

If we review the usage pattern of the computers based on the level of functioning, we see that the centers that are functioning well have fewer number of children working per computer, the number of groups made is highest as is the attendance. The number of computers present and

functional is not much more than the centers as compared to the centers whose functioning has been classified as average. What is significantly different is the number of children who can handle the computer without assistance even though the presence of the teacher is comparable to the average centers.

**Table: Usage Pattern by level of functioning**

| Indicators | | Relatively "Poor" | "Average" | Functioning "Well" |
|---|---|---|---|---|
| | | Mean | Mean | Mean |
| No. of children per computer | Mean | 13.26 | 7.72 | 4.25 |
| No. of groups made | Mean | 1.6 | 3.73 | 3.88 |
| Total No. of Children Present | Mean | 17.45 | 26.31 | 25.92 |
| No. of computers available in the Centre | Mean | 3.38 | 5.22 | 4.85 |
| No. computers working | Mean | 2.6 | 4.47 | 4.52 |
| Teacher Present | Percent | 59 | 83 | 85 |
| Children handle computer without assistance | Percent | 18.2 | 54 | 78 |
| Children cooperate with others | Percent | 59 | 82 | 85 |

The following table profiles the centers based on the level of functioning. **In effect this contradicts all the other qualitative data that has been presented earlier as the majority of the centers 75 per cent do not have working computers**.

**Table: Centre Profile by Level of Functioning**

| Variables | | Not functioning | Poor | Average | Well |
|---|---|---|---|---|---|
| Percentage of Working Computers | Mean | 75.12 | 75.4 | 82.25 | 92.23 |
| Total number of CDs available | Mean | 40.35 | 45.85 | 50.44 | 52.69 |
| In-school centre | Yes | 46.84 | 63.64 | 67.76 | 66.67 |
| Availability of electricity | Regular | 34.6 | 50 | 48.68 | 55.56 |
| Drinking Water Facility | Sufficient | 56.96 | 77.27 | 76.97 | 70.37 |
| Toilet Facility | Yes | 64.56 | 81.82 | 80.26 | 85.19 |
| Toilet Facility - Boys and Girls | Yes | 43.04 | 59.09 | 65.13 | 70.37 |
| Availability of play ground | Yes | 65.24 | 68.18 | 69.8 | 77.78 |
| Library facility | Yes | 70.82 | 77.27 | 87.25 | 81.48 |
| Fans in the rooms | Yes | 61.18 | 68.18 | 72.37 | 74.07 |
| Total number of rooms in school | Mean | 6.46 | 6.82 | 9.21 | 8.52 |
| No. of classrooms in school | Mean | 5.2 | 5.91 | 6.98 | 6.33 |
| When children are in the centre does other work go on? | Yes | 13.92 | 13.64 | 17.76 | 3.7 |
| Number of teachers associated with CAL | Mean | 2.21 | 3.73 | 3.49 | 3.89 |
| Number of teachers trained in CALC | Mean | 2.5 | 3.14 | 3.73 | 3.48 |
| Pupil Teacher ratio | Mean | 36.69 | 32.77 | 35.61 | 40.25 |

## 6.0    Interpretation and Recommendations

The following sections present the roles of teachers and head teachers in promoting computer aided learning. It also presents the synthesis of the data of the functioning of the CAL centers. This is followed by presenting the institutional and infrastructural arrangements needed for the promotion of computer aided learning followed by recommendations for the future.

### 6.1    Functioning of the CAL Centers

The review looked at the functioning of the CAL centers in terms of both usage patterns and level of functioning. Apart from that, there were observations of the centers as well as interviews with teachers and head teachers. The qualitative data indicates that there is appreciation for the programme whether it the idea of using computers to aid learning or the quality of CDs or the enthusiasm of the community and children. This situation begins to get complicated when the teachers are asked to name most useful CDs or the position of the teacher and his/her source agency or who has the responsibility of the repair, maintenance and electricity bill. The data suggests that there is a great deal of confusion in the school, in the minds of the teachers and the head teachers. What also comes across fairly clearly that there is a gap between what they think and what they do. **If the programme is to be a success then both the issues – the confusion in the minds of teachers and head teachers as well as the functioning of the centers will have to be addressed**.

### 6.2    Teachers, Head Teachers, Technology and Computers

Teachers and head teachers are aware of and positive about the role technology can play in the teaching-learning process. The general feeling is, that it is not time consuming to teach with computers and that computers are not only meant for the rich or for children in private schools or for boys only. There are however, a reasonable number of teachers in Andhra Pradesh and in Uttarakhand who believe that computers are only for the so called 'bright' children.

At the same time, an overwhelmingly large number of teachers and head teachers over all states believe that computers would address equity issues and the feeling perhaps is that even if at the moment it may help the 'stronger' children more it would enable the weaker children to get exposure and learn and over a period of time make them learn faster.  Team members of the Azim Premji Foundation also state the purpose of CALP as 'to bring equity' but emphasize learning for fun and joy more**.**

Many respondents from Karnataka and some from other States also feel that computers are not for rural children. This may have many elements that relate to the situation in the rural schools and outside but it seems to be in contrast to the universal encouragement to the effect of computers on equity issues as they and the Azim Premji Foundation team felt that computers can address equity somehow.

A third to about half the teachers over all the states feel that the eyesight of children would get affected by the use of computers. While it is true that the over-doing of the visual medium can cause difficulty, contact with the computer screen for a small duration in a day and the confidence that it can be done in a manner that does not affect eyesight needs to be addressed.

There is no reason to believe from the observations or from the responses, that technology or computers create problems for classroom management. Instead technology is considered essential. It is not felt that bringing in of computers would reduce the role of teachers. There is in

fact a perceived sense of pride in teachers and head teachers regarding the availability and use of computers in their school and individually in being able to use the computer. The attitude in Uttarakhand is the most positive and imbued with excitement about computers and their use in schools. This however does not necessarily reflect itself in the functioning of the computers and an effective computer aided learning program.

A larger number of respondents felt that children cannot handle computers on their own and need teachers to help and guide them. There was a reluctance to acknowledge existence of a sense of responsibility among children and also that children are quite capable of adapting to new technologies. This was however not seen so strongly in the CAL centre observation where children were generally allowed to function freely and they were mostly confident in handling technology and enthusiastic about it too.

There is also a wide spread feeling that computers are sophisticated devices, high maintenance and require careful handling. There is evidence of long delays and bottle-necks in the repair of computers once they develop even minor snags. There were also difficulties in finding resources for the repairs and for the payment of electricity bills. To this we must also add the fact that in Andhra Pradesh a large number of respondents felt that having toilets and drinking water facility is more important than computers. This view is shared by many in Karnataka and to a smaller extent in Uttarakhand. In Tamil Nadu it is an unambiguous vote for computers in schools and they have placed it above everything. It may however have to be seen whether it is because the schools in Tamil Nadu have these facilities already available and so are keen to have the next step.

### 6.3    Minimum Conditions for the success of CALP

The following sections at the structures and systems needed to make this computer aided learning programme a success. It focuses not just on infrastructural issues but at institutional issues as well.

#### 6.3.1    Coordination between partners

The general impression was that the institutional issues for the program to function were not set in place and even where they were, they were not sustained. The systems and forums between the State and the school and the development bodies at the local level needed for this just did not seem to exist. The feeling was corroborated by the field level and state level functionaries of the Azim Premji Foundation who pointed out that the administration at the middle and ground level was not interested in the idea at all. The financial requirements for maintenance, the honorarium, were problems but as mentioned earlier it was not even clear where the electricity bill would come from either. We may remember that electricity bill is not a usual regular expense for schools. The breakdown of the supply was frequent and the co-ordination between the power cut time and the time of the children coming to the CAL session not possible to attempt without considerable interest at all levels.

#### 6.3.2    Availability of computers

The number of working computers were much less than the total number available. Even what were available appear to the less then needed.

Except for Uttarakhand where there are upto 5 children are using a computer, the number is 10 or more for the other states. CAL session observations over all tell us that some children are seen

interacting with computers while the rest look at it and this might be a function of the fact that there are not enough computers to keep all the children engaged, even in groups.

Power back up with the UPS varies between 10 to 30 minutes in most of the centre over all states. Rarely, was the UPS working for more than an hour in spite of the fact that there is much load shedding, particularly in Andhra Pradesh and Uttarakhand.

### 6.3.3    Safety of Electrical Connections and component Maintenance

The switches and sockets in different places were generally unbroken and wiring covered and safe. The fitting on switch board were generally proper. However, switch boards were not firm in slightly less than 10per cent of the centers observed. This indicates that the organization responsible for putting up infrastructure and the wiring has taken adequate care to ensure that safety conditions are met.

It was however also noticed that in 15-20 per cent centers wires were put in without plugs and only 45 per cent of the centers in Uttarakhand and 37 per cent in Andhra Pradesh were earthed.

Dusting of equipment and cleanliness of the centre were satisfactory except for in 25 to 30 per cent of the centers of Tamil Nadu and Uttarakhand where dusting was not done more frequently than once a week and was also wanting in quality.

### 6.3.4    Sufficient sitting space

In a third to two third cases over all states, some children are standing while using the computer and sufficient sitting space, per child is not available in two thirds of the centers of Andhra Pradesh and Karnataka.

### 6.3.5    Confidence, Capability and Opportunity to access computers

As mentioned previously, children over all states are confident and enthusiastic in their use of technology. They are seen starting programs; using the mouse, opening folders, putting and changing CD's and also navigating them. There is some state wise variation and children of Uttarakhand and Karnataka were found to be more confident than those of Andhra Pradesh and Tamil Nadu. Children were also seen switching on computers in the beginning of CAL classes as well as select CDs to be used. Here also this was seen much less for children of Andhra Pradesh than other states.

Children over all states are interacting and cooperating with each other in their usage of the computer, even when more than one child is using it. They are not seen snatching the mouse or other components of the computer from each other. The sessions also appear to be functioning with equal opportunities for both boys and girls.

Besides a positive peer group interaction a healthy interaction is also seen between the student and the teacher. Children are seen seeking guidance from the teacher and in turn both the teacher and the YIF are seen responding to children and guiding them patiently and without aggression. There was no instance of reprimand or punishment of child during the observations of CAL session.

It is clear however that all children are not able to access computers and that not every child is using computers. In fact, in many centers some children remain away from the computers. It also appears that in many places the observations of the sessions were forced and the session would not have taken place in the absence of the observers. From looking at the data it appears that quality of observation recording and the time for observation was inadequate and therefore what we can say about how the sessions happened is limited.

In general, however, expected sense of enjoyment and freedom in all children was not borne out by the observations. There were many investigators who have mentioned that all children did not seem to be enjoying CALP sessions. (It may be mentioned that in some schools the timing of the study was inappropriate as exams were going on).

Teachers also generally agreed with the views of the investigators who felt that children are able to use computers. They also seemed to feel that they enjoy and are involved in it. They felt that going to the computer centre was not a waste and felt that it does not disturb other classes and increases learning opportunities. In Tamil Nadu and to some extent in Andhra Pradesh, however, some teachers felt it is wastage of time to go to CAL centers and that it disturbs other classes. Some of the teachers in Tamil Nadu also felt that classrooms get diluted due to CALP.

Teachers felt that children get opportunity for self-learning through CDs and there is no pressure on children to learn. They also felt that the atmosphere was not threatening (except that in Andhra Pradesh some teachers felt otherwise) and it promoted joyful learning. Yet a large number of teachers felt that all children are not capable of learning from the CDs. Many also felt frequent use of computers makes children computer addicts. (More than 60per cent of teacher in Tamil Nadu and Uttarakhand felt this.) Teachers also felt that children becomes more creative and get more confident and the program does not hinder the holistic development of children.

### 6.3.6 Understanding about CDs and their usage

Teachers and head teachers over all states have a lot of good things to say about CDs and learning from CDs. They feel that CDs enhance children's concentration, creativity and imagination, scientific temperament, and in fact achievement of children is better because of CDs. Interestingly they also say that once children see the CD they learn the content forever. The reasons for all these accolades for CDs seem to lie not so much in their content or in any support that they might extend to classroom teaching but in their visual appeal and the fact that they use the 'play-way method' and have 'entertainment value'.

The teachers pay lip service to the fact that CDs help children in self learning however they as well as the observation data suggest that children find correct answers by trial and error and not by engagement with the questions. Once they find the answers by trial and error they seem to remember and use it the next time they sit on the computer.

At places selection of CD's was done by teachers and at many others by children themselves. There did not seem to be pre-designed choice of which CD will be used on that day and in different session different children were using different CD's of their choice. This could point towards a lesser synergy between usage of CDs and classroom teaching.

Teachers and head teachers over all states are also markedly apathetic to the CDs lying with them. They have mostly not responded to any questions regarding CD's- number of CD's available, subject-wise break-up of CD's; preferred subject CD's; which CD's do they like or dislike; which they feel are more or less effective for children. This behavior is prominent in Andhra Pradesh and on the other hand teachers of Karnataka seem more aware of the CDs than the other states. It is only in Karnataka that teachers have mentioned names of individual CD's that they or the children like or dislike. In fact in Tamil Nadu, Uttarakhand and half of Karnataka it is the children who are choosing the CDs to be used during CAL class.

The reason for not being clear about how to effectively use CDs may be that most teachers have not seen more than a handful of CDs and are not even aware of the number of CDs, or the subject-wise numbers, leave alone their titles and their content. Teachers feel that they do not have sufficient time for looking at the CDs because of their work load in spite of the fact that they

feel so positive about technology, computers and CDs and its impact on child learning. In the absence of knowledge about what lies in the CDs, it is not possible for them to plan and integrate working on CD with their teaching program. Since it does not become a part of the teaching program, CDs become redundant to the concepts and ideas being discussed at that point of time and therefore can only be used for recapitulation or worse.

There seems to be a common feeling among teachers and head teachers that community participation and enthusiasm had increased when the computers had come in. The schools also feel proud that they were chosen for the computer centre but are not very sure as to why their school had been picked.

Teachers over all states say that they have bought about changes in their teaching methods due to CALP but are not very reflective about what these changes are or why they were needed. They feel that CALP introduces technology to children at the right age, helps in the holistic development of children and is a source of joyful learning but as most teachers and head teachers seem to understand CALP as a program which will 'familiarize children to the computer and its usage', 'entertain them' because of its visual appeal and 'reduce their work load' by keeping children occupied for some time.

On the whole, there seems to be a lack of communication and understanding about the purpose of the program and their role in it. So while teachers were mostly present in the classes they were not very clear about their role and were not even very sure about how to deal with the content of the CDs.

### 6.3.7    Utilisation of CAL session time

Most teachers felt that there is insufficient time for computer aided learning to take place. Their reasons for this include- lack of an adequate number of computers, shortage of teachers and syllabus work load. While teachers felt so, in most centers computers were switched on only after the children came in thereby wasting a precious couple of minutes.  There is evidence of some CDs being copied to the hard disk; however this is nowhere true for all the CDs. Moreover, there seems to be no fixed time for CAL classes in the school time table.

The teachers also appear confused about helping a child learn how to use computers and explaining everything given in the CD to the child. A prominent reason given by them for CAL time not being enough is that one CD cannot be 'taught' or 'explained' in one period.

### 6.3.8    Perceived needs of teachers and head teachers:

Most head teachers while appreciating the support provided by Azim Premji Foundation felt that there was a need for greater support. As many as 80per cent of head teachers in Karnataka and 40 per cent in Tamil Nadu were keen to get more infrastructure and CDs in local language. They also felt more training was required for the teachers.

Head teachers of Karnataka and Uttarakhand, where no extra person is present to coordinate CALP felt the need for one.

Agreeing with head teachers, teachers over all states felt that they required training and that the training they had received was not adequate because it was not long enough and not interesting. What emerged from the discussion with them as well as with the team members of the Foundation engaged in the field was that training was extremely inadequate and did not prepare teachers for even handling computers.

Most of them also did not have a manual and it appears that they would like a manual that would help them understand their role and help them in troubleshooting.

A large number of teachers felt that more computers and CDs were needed and that infrastructure should be immediately addressed.

Teachers over all states except Andhra Pradesh felt that head teachers should also be given training under CALP. Moreover teachers felt that head teachers were essentially required to help planning the time table for CALP and for its supervision.

### 6.3.9    Views about CD and Program

There are a lot of suggestions as well as positive opinions about CDs. Most teachers feel that CDs helps in learning of subject matters and promote self-learning. Except in Tamil Nadu where two-thirds of the teachers do not feel so most of the teachers in other States feel learning from CD is good. However, a half of them feel that systematic approach for learning is not possible through CDs and that CDs do not have learning items for self-evaluation.

According to many teachers, parents think that learning through CDs is better. The figures for this in Karnataka and Tamil Nadu, however, are much lower. For example in Tamil Nadu only 33 per cent teachers feel so. The teachers are also not so sure about their friends wanting to teach through CDs. In Andhra Pradesh and Tamil Nadu only 1/3rd of the teachers feel that their friends want to teach through CDs and (this corroborates with the number who feel that CD is more effective than the textbook) the teachers in these States do not think that their friends want to teach through CDs. This despite their agreement with the statements that student achievement is better than before and CD's are attractive, enhance interest and creativity. They help in recapitulation, increase concentration and peer learning. There seem to be no clear pattern regarding the use of CD's except that Uttarakhand and Karnataka seem to reflect a more positive view compared to the other two States. We may add that regarding the effect on reducing drop out amongst children, however, Karnataka teachers do not feel as positively about CAL reducing drop out.

A fair number of teachers do not consider textbooks and CDs to be any different. Those who find it different ascribe it merely to TLM and to play way methods. CDs are felt to be more expensive than textbooks and better than other TLM. They are interesting and useful with relevant examples. This is however, not backed by adequate knowledge of basic things like the names of CDs.

### 6.3.10   MoU and the Government Partnership

There were major issues regarding the relationship with the government. Interviews and discussions with the team indicated differences in perspective. They all had a personal view and felt strongly about it. They generally implied that CAL had made significant improvement in schools but were not able to provide clearly the key assumptions of the program and those of them that had not worked. They also were not generally able to suggest what should the new set of assumptions be and how should the Foundation position itself in its work. One of the key persons pointed out that before him/her, the perspective equated presence in State to providing content, giving training, going periodically to schools to interact with teachers, monitor use of content and see where and what are the hardware issues and how  the whole program integrated with the time table. His/her perspective was different. The need was to engage with perspective of teachers regarding content, its convenience, relevance and logistics. Azim Premji Foundation has not been able to engage with the teachers at deeper level. There was an indication in interaction with the team of a feeling of very rapid expansion and a lot of expectations from the government.

This expectation and the underlying assumptions have not somehow worked. This has resulted in a large number of Centers being dysfunctional.

There was, however, no clear common articulation of the underlying assumptions. One of the team members suggested that there is a need to first discuss and think through the infrastructure needed based on some calculations and how much time each child would need. There is also a need to focus on the content and develop the content with local teachers as well validate existing content and produce new one. A lot of importance needed to be given to developing basic skills of teachers as also to the government for developing its own team, of resource persons. Monitoring systems need to be worked upon, with 20 to 25 schools to begin with by working intensively in the schools instead of beginning with a large numbers of schools all at one time. There was a feeling in the team that the pace of expansion was too fast as result of government pressure but there was no clarity about how things should have happened and how States can be made to own their MoU.

The review of the MOU's with the State showed variation in the relationships that are possible and the changing scenario for the Government and for the Foundation. This may be seen starting from the first MOU signed with the Karnataka Government, an MOU that is over-arching and signed by Mr Premji himself and the Chief Minister of the state. The subsequent ones are more limited and specific. The rank of the officer signing on behalf of the Government has now generally become the state Project Director of SSA. The MOU's have increasingly attempted to become more specific in their expectations and defining down specific responsibilities. They cannot however still force the Government to specify the extent and the source of funds that would be earmarked for the effort. Or specify the people who would be delegated. They also cannot specify the mechanism for even anticipated recurring expense. As the details and the issues of significance considered possible to be included are put in, new issues arise. It is clear that no program can survive with a disinterested officer and that too would at best run as Government programs run i.e. with uncertain prioritization, divided attention, thin resource allocation, unearthing of newer rules or why something that has been agreed upon in the memorandum cannot be allowed etc.

### 6.3.11 Production of CD and role of the Foundation:

Regarding the production of CDs it was felt that there was a need to work more on them and involve a large number of people in it. Some of the basic difficulties related to the CDs were recognized but it also appears that there was inadequate communication and a lack of ability to take decisions quickly on the feedback received. This may largely be because of the fact that there is not much available from other sources and Andhra Pradesh is pioneer in this area. Those involved in the production of CD and their conceptualization, however, still seems to be working around ideas on hard spots and struggling with questions related to the textbooks and syllabus. The buy in of the teachers was sought to be obtained through providing with materials that would be directly usable as part of the textbook teaching rather than engage with the questions of teachers buy in at a deeper level.

There is a need for the Foundation, as a pioneer in this area of attempting to produce somewhat interactive materials for children at elementary level in Indian conditions and in Indian languages to take stock and analyze its effort. There is a strong need to produce materials that are interesting and exciting for children apart from giving them an opportunity to engage with concepts and ideas. The present process in the Foundation does not appear to be clear. The strand of making self learning, exploratory and fun providing materials for children is sought to be included with relevance to the curriculum, addressing hard spots and relevant in the eyes of the teachers strand.

The production process that relies on conceptualization by the teachers and middle level educational functionaries also results in the CD's being linear and mechanical. There is a need to invest in this area after clearly articulating the niche being addressed. The niche is to provide material that would be available and can also be picked off shelves. Rather than implementation, with the Government schools in large numbers the USP has to be the production of material of quality that children would enjoy and engage with.

From the teachers and head teachers as well there was a clear expression of need from Azim Premji Foundation and they felt that they needed more computers, better infrastructure and more training. They felt that although CALP helps in child development and there have been positive changes because of CALP and that Azim Premji Foundation has done a lot for the program, this was not adequate. They in a sense expected Azim Premji Foundation to work with the systems and filling gaps to ensure that things happen.

**6.4    Future Implications:**

**6.4.1**    No clear special parameters for the functioning centers except general factors were generated by good schools. Very few centers have regular functioning centers and the number where a meaningful program is running is perhaps negligible.

**6.4.2**    The very small centers are working well. To understand them they can be used as samples.

**6.4.3**    The Government. partnership does not work the way it should and we need to make the basic process and infrastructure available.

**6.4.4**    Azim Premji Foundation should work towards developing better materials and make it available to more schools rather than through program intervention with the Government.

**6.4.5**    The Foundation should review its strategy and reduce the number of schools it is working with. It should work with institutions that can provide computer facilities and guidance for use of CD materials and work towards seeing the potential. Or it should provide the necessary infrastructure as well as an instructor to ensure that the centre functions well. The present form of skeletal structure without an instructor cannot be expected to have an impact.

**6.6.6**    The study was planned into two parts. This is a report of the first part that was a survey. One of the primary reasons for the survey was to identify centers that would be chosen for a subsequent detailed qualitative study on issues of motivation and perspectives of children as well as their understanding of the concepts practiced in the program, the content and method of the CD's etc. It is clear that with the small number of centers functioning well or even functioning averagely, the second phase of the study may not be very productive.

# Annexures

# Expected Outcomes

The expected outcomes spelled out for the aforesaid objectives were listed – and it was decided that such an exhaustive study cannot be done in one shot. It was there agreed to explore them in two phases.

1. Categorise CAL centers

   - Percentage / proportion of CAL centers that are functioning well and somewhat according to our expectation.

   - Percentage of those that are just average.

   - Percentage of CAL centers that are dysfunctional.

   - Identify and understand the conditions in which a CAL centers functions well, averagely and poorly.

2. Identify/list out the expectations of the following:

   - Children

   - Teachers

   - CAL facilitators (if different from teachers)

   - Head Teachers

   - Educational Administrators

   - Parents / community (need to define this)

   - Azim Premji Foundation team in contact with the CAL centers

3. Discern usage patterns:

   - Group learning (optimal size)

   - Time per child– what is the variation across centers/regions

   - Explore age, gender, caste etc and better performing children. For this, these issues need to be included in the Stage 2 interview schedule/questionnaire.

4. Identify teacher characteristics that enable a centre to function well– age, gender, educational level/background, urban exposure and so on.

5. Discern/identify the academic support/supervision that enables a CAL centre to function well.

6. The effectiveness of CDs/education material, which can be scored on the following:

   - Those that children find easy to use and therefore like

   - Those that are interactive and therefore children like

   - Material for good recall

   - Material that teachers like and promote/encourage children to use

- CDs that demand proactive participation of children and CDs that make children passive.

- Subjects which children feel that they can learn well– Mathematics, Language, Science, EVS, through computers.

7. Alternative models of rolling out the program– what are the relative strengths and weaknesses of each.

8. Teacher identification and training– teacher selection, training, ongoing academic support and how they influence the CAL program.

9. Feedback on a range of management/supervision/academic support related issues.

10. Cost per child, provided data is gathered on cost of all aspects of the CAL program– including training, cost of material production and so on.

11. Questions we can seek and hopefully get some answers:

   a. Does it improve attendance? For this data of past trends may be needed to make any conclusive observation.

   b. Does CAL improve motor skills?

   c. Does it increase curiosity among children / make them inquisitive?

   d. Does it help them overcome intimidation to technology?

   e. Has it changed classroom culture? Or is the "new" culture limited to the computer room? (again defining the new culture is important)

   f. Has it motivated the teachers?

   g. Do children reach out to the computer to access information?

   h. Do teachers use the computer to :

      - Explain difficult concepts to children;

      - Plan their lessons / time table

      - Maintain records of children – attendance, test performance

**Difficult areas to Explore:**

Apart from these observations, the following points also would be looked at. These would be difficult to capture and may only get partially discussed in the conclusions.

   a. Attention span of children, does it actually increase concentration levels?

   b. Does CAL assist in concept development?

   c. Does it improve self-confidence among all children / few children?

   d. Does it motivate children towards self learning?

   e. Does it promote peer learning / group learning (sometimes this may be limited to the CAL centre alone and may not be carried forward to the school)

   f. Do computers lead to a more child-centreed as well as non-threatening learning environment? Or does it intimidate / alienate children.

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# Methodology

The expectation from the study is vast. The questions that need answers are varied and complex and needed long drawn out observations. It also requires obtaining data of a kind that needs experienced investigators.

It was not clear, which centers are functioning and would be able to provide the opportunity to collect the data needed. It was not possible to address all the centers at one go, too. Hence, it was planned to carry out the study in two phases:

**Phase-I, Survey:**

The first phase includes an assessment of the ground realities of the program, in terms of its actual implementation and, availability and utilisation of infrastructure. This data will be collected through observations; questionnaires and self-completion scales from teachers; some feedback from the children etc. In addition, the program implementation team will also be interviewed to get an internal perspective to supplement the findings from the field. This would be a large sample study and would cover about 10per cent of the schools, selected at random from the universe of schools where CALP is being implemented.

**Phase-II, In-depth Study:**

The findings of Phase I would feed into **Phase II** – which will be a more qualitative and in-depth study of the program. It will explore, in detail, how children have responded to/ utilised the CAL facilities; do they find CAL interesting and useful and to what extent; does it help them develop skills, learn ongoing lessons/subjects; help conceptual development as well as help in increasing their confidence in technology. It is also hoped that the attitudes, skills and motivations of teachers would be assessed. We should also be able to better understand the attitude of the larger education system to the CAL program, and support provided by them thereof. Most importantly, it is hoped that the in-depth study will enable the foundation to get feedback on the content of the CAL program – the CDs prepared by the foundation and those purchased from the market.

At the end of the first phase it was hoped to get a good understanding of:

a.      How is the program getting implemented across the four States?

b.      A quantified assessment of the status of implementation

c.      Are there key differences across the 4 states?

d.      How do teachers and state functionaries generally view the program?

e.      What are their attitudes and perceptions?

**Annex 3**

# Tool Development Process

Before finally deciding on the tools, a detailed analysis of the areas and sub-areas to be addressed by the tools was done through a workshop. For this purpose three groups were formed and the areas were identified as follows:

I.  **Methods and mechanism of implementation:**

    **1. Nature of Azim Premji Foundation's involvement in the program and state interface.**

- MoU - design and scope of involvement for Azim Premji Foundation, government
- Format of hardware procurement
- Sole content provider
- Attitudes of SPD, CAL Incharge, DEO/DDPC, DIET, Pedagogy Coordinator, MEO/ BRT, CRP/MEO.

    **2.     Components of the program.**

- Effectiveness of off-school vs. on-school models
- Level of teacher involvement
- Support from the Government. and community
- Number of schools attached

    **3.     Content selection and validation.**

- Identification of CDs from the set of 25.
- Process of selection of validating team
- Process of validation

    **4.     Criteria for identification of schools.**

    **5.     School history and infrastructure**

- Socio-Economic Status of teachers
- Background of school - who started it, how it started, present infrastructure, Pupil Teacher ratio
  - Village economic profile
  - Children's background

    **6.     Infrastructure**

- Selection of hardware supplier.
- Process of set-up
- Installation of computers-process, time etc.

- Mechanism of maintenance of hardware-daily internal maintenance and external maintenance.

### 7.    Training.

- Selection of MRP/KRP team

- Components of training

- Cascading of training to teachers - dilution

- Minimum Hardware knowledge and training

- Provision to work with CDs

- Understanding of mapping

- Time gap between training and hardware supply

### Support to training

- CD content support

- Mapping support

- Communication of new CDs and presentation

- Guidelines:

  - Validation process.

  - Effectiveness.

  - Reach

- Other means of communication to the practitioners - quality, frequency etc.

### 8.    Monitoring

- Persons involved

- What is being - monitored - academic, data collection

- Quality and academic credentials of monitoring person

- Frequency of monitoring

### 9.    Foundation team assessment

- Nature of people in team

- Skills

- Understanding of concepts (T)

- Interface required with Government. teachers etc.

- Induction and training

- Role in monitoring

10. **Feedback.**

- Sharing forums for practitioners
- From children
- Teachers
- Partners in the field – Block Educational Officers (BEOs) etc.
- Community
- Foundation members and team
- Channels for structured observations
- CALP audit form - evolution, effectiveness
- Implementation of feedback
- Model of Sustainability

II. **Teacher Related Aspects:**

1. **Teacher Attitudes.**

- Training
- Content in the CDs
- Computers and Technology
- Mechanisms for the program
- School planning and time table
- Classroom culture

2. **Teacher preparation-post training**

- Time table preparation
- Viewing and mapping of CDs
- Grouping of children
- Time gap between training and program implementation in school

3. **Teacher understanding and competence (1,4,3,2)**

- School planning
- Classroom culture
- Understanding of the concepts in the CDs
- Purpose of using the CDs and computers
- Knowledge about CDs
- Knowledge about computer system

4. **Teacher involvement**

- Integration with the CD

- Adherence to time table

- Adherence to groups

- Engaging the other half of the class

5. **Head teacher involvement.**

- Knowledge about CAL.

- Awareness about what is happening in school (teacher/children).

- What other initiatives for use of computers and technology? (uses/resources) mobilization, community participation)

- Managing CAL issues.

**III.** **Child related:**

1. **Children's participation (what is observed)**

- Time allotted

- Adherence to time table

- No. of children accessing the computer

- Grouping norms and access

2. **Attraction of computers.**

- Increase desire to use computer

- "Price" children would be willing to pay to get additional time.

- Attendance - increase in attendance or not CAL Vs. non-CAL.

- Attendance in schools

- Enrollment

3. **Engagement and Retention**

- Do children have higher attention span

- Is there increased concentration level?

- Task completion - Efforts

- Lingering effect

- Long term memory

- Application Learning

4. **Skills, Learning, Conceptual Development.**

- Performance of test - oral and written

- Skill at using computers

- Does is increase motor skills in children?

- Does it have any bearing on peer learning?

- Self-learning

- Does it increase problem solving ability?

- Does it help children in improving communication skills?

- Conceptual understanding

5. **Behaviour, Attitudes, Social Interactions.**

- Intimidation by technology

- Cooperative behaviour

- Self confidence of children

- Does it increase curiosity?

- Does it increase desire to access information?

- What impact does it have on gender and caste issues?

- Relationship between teacher and children

- Aggressive behavior

In order to get data related to the above areas, the following tools were used:

1. Head Teacher Interview Schedule.
2. Teacher Personal Data Sheet.
3. Teacher Interview Schedule.
4. School Observation Schedule.
5. CALC Profile.
6. Observation Schedule for CALC Session.
7. Teacher Attitude Scale.

All the above tools were field tested before being finalized. Following were the suggestions received and incorporated after discussions, based on an item analysis of the tools:

**Personal Data Sheet**

- Title to be Personal Data Sheet (PDS) instead of Teacher Personal Data Sheet and to be administered to the Head Teacher along with the teacher.

- The personal data sheet to be administered at the end of interviews.

- To ask household related questions as a combined one and leave out questions on spouse's income as that seems intrusive. Ask only about items in the household, etc to get the socio-economic profile.

### Head Teacher Interview Schedule

- Remove all questions related to personal information as they will be captured by the PDS

- To have the 'don't know' option for questions so that Head Teachers who are unaware of CALP can also be identified.

- Head Teacher Interview Schedule be the first schedule to be administered so that the Head Teacher is more aware of the study and any anxiety regarding the presence of surveyors is reduced.

### Teacher Interview Schedule

- To add a few questions that capture their designation and the subjects that they currently teach, to help in analyzing the profile of teachers that are amenable to new ideas like CALP.

- To be administered to the teachers whose classes are involved in CALP.

- The same questionnaire (with slight modifications) to be administered to the YIF, wherever applicable

### School Observation Schedule

- Appropriate and easy to track Coding to be developed for all schools and school codes to be mentioned on all sheets.

- To provide certain information to the surveyor for collecting data through observation.

- To collect data for distances in meters rather than kilometers.

- Questions to be added on CAL centre functioning – if CAL centre is not functioning for more than a month all the interview schedule need not be administered; only Head Teacher Schedule and one Teacher Interview (preferable CALC in-charge) to be completed.

- This schedule to be completed after the Head Teacher schedule

### CALC Observation Schedule

- To incorporate a '4 point scale' for all options following a 'easy to difficult' progression among the options.

### CALC Session Observation

- To ask the surveyors to provide a short qualitative report on the session(s) observed (so that some of the nuances of the session and unique practices of a school are not missed out).

### Teacher Attitude Scale

- To change the title of the instrument.

- Teachers should fill it themselves; and should not be read out by surveyors.

- Clarifications can be provided on any of the statements, but no explanations should be provided for them.

- In case of collaboration between the teachers – the data sheets to be identified (starred)

**Annex 4**

# Data Collection

## Preparation for Data Collection

Data was collected by field investigators and surveyors who were given training for the same. The following were the considerations kept in mind in selection and training of field investigators:

- Local volunteers to be recruited

- Training to be of a minimum of 3 days; The following issues to be addressed during the training–

    a.    Background

    b.    A day discussion to understand the tools

    c.    A Mock exercise in the workshop

    d.    A Dry run

    e.    Tabulation practice at the end of the data collection

    f.    Training to fill codes, etc correctly

- Training to be held in the respective states rather than transportation of investigators to each place.

- Training to be conducted by Azim Premji Foundation in all the states

- Selection of about 20 good investigators for phase II of the study

## Logistics of data collection:

A team of two visited one school for two days in all states to collect the information as per the work flow chart mentioned below. 24 investigators collected data for a month in Andhra Pradesh and this was true for 8 investigators in Karnataka, 10 in Tamil Nadu and in 8 in Uttarakhand In schools that CALP was supposed to be functioning but is not, surveyors were asked to collect the required information from the head teachers and teachers and not spend two days in the school.

In Tamil Nadu, the cooperation of Tamil Nadu Science Forum (TNSF) was enlisted for conducting the study. In Andhra Pradesh, Karnataka and Uttarakhand, independent investigators with prior experience with carrying out research data collection were identified.

## Training for Data Collection

The   objective of the training program was to introduce data collectors to the objective of data collection, its methodology and its tools. The training was organized for two/three days. The training program was also meant to facilitate the process of   forming teams for data collection and preparing a general plan of action.

## The Work flow chart

The work flow chart shows the data collection process at the school and the instructions given to the investigators for collecting the data. This work flow chart formed the basis for data collection in all the states.

**Annex 5**

**Data Collection Process –Orientation to Field Investigators**

| | **Work flow for data collection – CALP** | | |
|---|---|---|---|
| | *The team should arrive at school in time preferably before the morning school assembly starts* | | |
| | **Member 1** | **Member 2** | **Time** |
| STEP 1 | Meet HM.  Introduction with the authorization letter to the Head teacher and other teachers. Explain the objective of the research and how in one/two days the data would be collected. | Meet HM.   Introduction with the authorization letter to the Head teacher and other teachers.   Explain the objective of the research and how in one/two days the data would be collected. | 10 AM to 11 AM |
| STEP 2 | Complete  Format 2 :Head Teacher along with member 2 | Complete  Format 2 :Head Teacher  along with member 1 | |
| STEP 3 | Complete format :  Personal (HT) | | |
| | **If the CALC is functioning go to step 4** | | |
| | *Complete head teacher's interview and all teachers interviews (LPS 1st -5th class including PE teacher and any other teachers) i.e., questionnaires 2.a and 2.b.  Even if the CAL is not functioning* | | |
| STEP 4 | Format 2a: Teachers Interview -1; Format: Personal; Hand over Format 2b to the teacher (after the completion of the interview schedule) to be filled by the teacher herself. | Complete Format 4: CALC Profile, and Format 5. Observation Schedule – CALC session | 11 AM to 12 AM |
| STEP 5 | Format 2a: Teachers Interview -2; Format: Personal; Hand over Format 7 to the teacher (after the completion of the interview schedule) to be filled by the teacher herself. | Complete Format 5. Observation Schedule - CALC session | 12 AM to 1 PM |
| | **LUNCH BREAK** | | |
| STEP 6 | Format 2a: Teachers Interview -3; Format: Personal; Hand over Format 2b to the teacher (after the completion of the interview schedule) to be filled by the teacher herself. | Format 3: Observation Schedule - School Profile | 2 PM. to 3 PM |
| **STEP 7** | **Complete YIF or CAL In charge questionnaire (format 6) where ever applicable** | | |
| STEP 8 | COLLECT FORMAT 2b: TEACHER'S QUESTIONNAIRE -2b FROM TEACHER 1,2 AND 3 | | 3 PM to 4 PM |
| STEP 9 | CHECK ALLTHE SCHEDULES FOR THE MISSING DATA -  AND COLLECT THE MISSING DATA IF ANY | | |
| STEP 10 | Thank the head teacher and the teachers for cooperation | | |
| STEP 11 | By the end of the day check all the formats, bundle all the seven formats of the | | 4 PM |

| | school; on the cover write the school code to hand it over to the coordinator | To 5 PM |
|---|---|---|
| | *Prepare for the next day's, next school's  data collection* | |
| *Members should rotate the data collection responsibilities for the next school. Team member will take up the tasks of member 2, and member 2 will take up the tasks of member 1.* | | |