

Consultation on 'National Policy on ICTs in School Education'

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Short Discussion Paper
**ICT policy recommendations from Computer Aided Learning
experience for 6 years spread across 14 states**

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I. Background:

There have been many attempts made to use technology in Education across the world including in Indian schools in the past few decades. Several initiatives have been implemented in education across levels from primary to tertiary education. About 15% of schools across Indian states have been supplied with technology hardware in some form or the other. The impact study of various experiments including those at the global level has provided mixed results. It could be appropriate to summarize that while the experiments have indicated relevance for technology in education it has also shown that blindly equipping schools with hardware without clearly articulating the strategy for deploying the same for educational purpose, the entire exercise does not result in positive influence on the educational process in the school. On the contrary, such deployment could frustrate the expectations of practitioners and create negative perceptions about technology in education.

II. About Computer Aided Learning program:

Genesis

Azim Premji Foundation (hereinafter referred to as the “Foundation”) began its work in education domain by launching an effort in about 1300 villages in Karnataka state to enroll the out of school children in the schools. While interacting with the parents of the children, the Foundation asked them their expectations from their children. Two responses emerged consistently: (1) we want our children to be able to speak in English (2) we want our children to be able to work on the computer.

Among the several initiatives deployed to attract and retain the children in the school, the Foundation also thought of introducing computers in the school – bearing in mind the expectations expressed by overwhelming number of parents. This is how a pilot project of Computer Aided Learning (then CLC) in 2001 in 35 Govt. primary schools in two identified districts of Karnataka.

Consensus

The above was done after holding a two day “national seminar on usage of technology in education” where the participants consisted of heads of government education departments of various states, academicians, multilateral agencies and teachers. This was followed up with intense interaction with about 80 teachers from 4 states.

Digital Learning Resources

Based on the above interaction, it was decided to develop curricular and co-curricular digital learning resources for children in 1-8 standards. Priority was given to topics that the teachers felt either too important as building blocks to learn subsequent modules or those that leveraged the power of software medium better. The digital learning resources were child navigated; story and animation based and contained fun material such as riddles, puzzles,

songs and exercises for children to know how much they have learnt. Each digital resource was in the form of a CD that was in 3 languages – English, Hindi and the local language of the state in which the resource was used. Today, the Foundation has the largest repository of digital learning resources in 18 languages including 4 tribal languages.

National demand for the Digital Learning Resources (DLR)

Several Indian states provided computers in government schools primarily through the funds available from Sarva Shiksha Abhiyan (SSA). There were a few states that decided to invest in computers in schools on their own.

At high school level, there was a strategy in most states to use the computers to impart computer knowledge ranging from how to operate the computers to how to use word, excel and power point applications.

However, in most schools at primary school level there was no strategy on how to use the computer to enhance educational results. Many of these states found the Azim Premji Foundation digital learning resources very useful among others, the following key reasons: (a) the DLR addressed some of the curricular needs of the states (b) DLR was in local language and there was no other significant DLR available (c) DLR was provided free by the Foundation (d) in the absence of internet, the CD based DLR was found to be convenient to use.

Conditional free supply of DLR by Azim Premji Foundation

Whenever the state approached the Foundation for supply of DLR, the Foundation placed before them the following process:

- 1) The state will formulate at least a 4 member team of pedagogists (mainly from SCERT) and send to the Foundation's office to understand, among others, the following:
 - a. The process of preparing the DLR by the Foundation
 - b. The principles of education used in preparing the DLR
 - c. The process recommended by the Foundation to deploy DLR in the schools
- 2) The state will create a team of pedagogists that will review the DLR developed by the Foundation in details primarily for its suitability for the state, the context, the culture, the language etc. and confirm the same as fit for the state. In case this team suggested modifications in the existing DLR, the Foundation would carry out the same at its cost for the state.
- 3) The state will create a team of master facilitators who will interact and will be developed by the Foundation to interact with the teachers to create among the teachers:
 - a. Understanding about the content of the DLR
 - b. Comfort to use technology
 - c. Alternatives to integrate the DLR in their teaching learning process
- 4) The state will appoint a competent nodal person to coordinate and monitor the progress of computer aided learning across the state .
- 5) The Foundation will also appoint one person for the state to work closely with the nodal person of the state government.
- 6) The state will ensure that the schools where the DLR is being used by the children will schedule their time table in a way that each child will be exposed to the DLR at least twice a week.
- 7) The Foundation will carry out necessary research and the state will cooperate in the same.

The Foundation experienced that despite a concrete MoU signed to the above effect, in most state, the usage of DLR was not guided by the above understanding.

The Foundation accelerated the pace of developing DLR and also translating the developed DLR in several languages on the state demands and significant effort and monetary investment was made in the entire process.

Simultaneously, the Foundation also explored several areas such as cost, electricity, hardware deployment options, children comfort in usage of computers etc. and informed the states about the same from time to time.

Review of status of computer aided learning with the Foundation DLR

After 6 years of hectic effort, the Foundation decided to take stock of the quality of implementation of computer aided learning and its impact on schools, teachers and children. Several internal meetings were held of persons who were closely involved in implementing the computer aided learning in over 16,000 schools across over 14 states in India. And there was a unanimous feedback that the modality in which the DLR is being used is not achieving anything significant. Several insights were shared by the members of Foundation who were associated with the computer aided learning at ground level.(but did the feedback also provide exceptions where the dlr was used to significantly impact the learning processes. We could mention this)

The Foundation also decided to commission an independent research on the status of computer aided learning. A large scale survey and observation of schools and Computer Aided Learning Centers (CALCs) in four states was conducted to assess the ground realities of the programme in terms of its implementation, availability and utilization of the infrastructure. The sample selected for the study comprised 438 schools – 206 from Andhra Pradesh (AP), 96 from Karnataka, 96 from Tamil Nadu (TN) and 40 from Uttarakhand (UA). The main findings of the study are summarized below.

Major findings of independent research

1. Functioning of the CALCs

- a. Of the 438 schools in the sample, CALCs in only 47% of the schools could be considered as ‘functioning in some manner’.
- b. As many as 53% of the CALCs were not functioning at all. This was true across the four states with 59% centers in AP, 55% in UA, 47% in Karnataka and 45% in TN not functioning at all.
- c. Of the working centers, only 27 (6.2%) could be considered as working ‘well’. In fact, on the day of the survey visit, only 34 CALCs were found to be working.
- d. The major reasons cited for this state of affairs related to infrastructure and administrative problems. These include maintenance problems with computers, inadequate and irregular power availability, non functioning UPSs (Uninterrupted Power Supply). In some cases, the computers were said to be not working from day 1 after installation. There was evidence of long delays and bottle-necks in the repair of computers even if there were minor snags. There were also difficulties in finding resources for the repairs and for the payment of electricity bills. The general impression emerging was that the systems for the programme to function were not set in place and even where they had been set in

place they were not sustained. A further reason cited was non availability of CDs in local language in all the subjects and all the four lower primary classes

2. Training and monitoring

- a. The training provided to the teachers for using the computers was considered inadequate.
- b. Even trained teachers faced problems in incorporating CD content in classroom sessions. They did not seem to prepare for CAL sessions.
- c. Only 59% of the trained teachers were aware of the resource bag in CD. This clearly indicates that a large proportion of the teachers had not gone through the CDS at all.
- d. Children were not getting sufficient time to work on computers in CAL sessions. Even trained teachers found it difficult to ensure computer time for each child. Besides inadequate training and lack of preparation on the part of the teacher, power availability also contributed to this.

3. CD content

- a. A small number of the teachers felt that the CDs are not effective because they are not related to the subject. The explanation given in the CDs is improper and inadequate. There are operational problems with CDs and the content is difficult.

4. Attitudes and perceptions

- a. Teachers had a positive attitude towards technology and CD content.
- b. However, their perception seemed to be different towards CAL training and the overall programme.
- c. Only 36% of the teachers showed a positive attitude towards CAL training and just about 38% were favorably inclined towards CAL programme itself.
- d. They had in general a positive attitude towards technology and computers.
- e. But a reasonable number (63%) of teachers believed that computers are really useful for the brighter children.
- f. It is, however, surprising that an overwhelmingly large number (80%) believed that computers would address equity issues to a certain extent.
- g. Many respondents (32%) also felt that computer aided learning is not possible for rural children. Rural schools may have their own problems but the attitude is in contrast to the general view on the effect of computers on equity issues.

5. Positives of the programme

- a. The positive side of the programme was that the programme, according to the trained teachers, helped them to change their teaching methods.
- b. All children of Uttarakhand seemed to be enjoying working on computers.
- c. This was true for about 85% children of Andhra Pradesh and Tamil Nadu and 69% children of Karnataka.
- d. There was a common feeling that the community participation and excitement had increased with the use of computers in schools. The schools also felt proud that they were chosen for the CALC but were not very sure as to why their school had been picked.

6. Some of the suggestions made by Head Teacher and Teachers to improve CALP were

- a. Address infrastructure problem and ensure immediate repairs and maintenance (62%)
- b. More and better training and information needs to be provided to teachers (38%)
- c. There is a need for CAL in-charge or a special teacher to look after the CALCs (27%)
- d. The CD content needs to be improved (10%)
- e. Other suggestions given were: More supervision, More time/periods for CALP, provide financial support, Arrange competition, Reduce regular classroom burden of teachers, need for support of parents/SDMC, active community participation and cooperation of teachers and head teachers.

7. Conclusions

To conclude, there is a gap between the CALP as envisaged and implemented and its concept and understanding has not been shared by the teachers fully. There is an urgent need to address the infrastructure related issues, monitoring and training of the teachers. The whole hearted involvement of the teachers in the implementation of the programme is very crucial. There is also a need to review the CD content to ensure that it supports the teachers' needs and expectations.

III. Policy Recommendations based on CAL experience of the Foundation

1) Need for National Vision, Strategy, Goals and Objectives

- a. The objectives of ICT cannot be independent of objectives of education in general; rather it needs to be drawn from the educational aims. Since ICTs can play a variety of roles in the educational process, this needs to be understood and accordingly planned in the context of Indian geography and present times.
- b. The context of govt. Primary schools in India is far different. The PTR is far poorer than recommended and varied. Multi-grade situation, large classes and shortage of teachers are prevalent systematic issues. ICT experiments in India are dappling with the basic situation and are unable to cross the barriers of the present contexts and focus on progressive ideas of innovations in pedagogy and changing the way children learn etc.
- c. ICT is no panacea to the basic situation but it is powerful tool to bring about changes in curricular aspects like content, learning processes etc. and of course, in managing the reach.

2) Learning and ICT:

- a. The relationship between learning and use of ICTs needs to be established.
- b. Use of ICTs should provide new vistas of learning through different skills.
- c. It should change the way teachers teach and students learn and impact classroom culture and school culture.
- d. It should thus redefine role of the teachers not as a traditional provider of knowledge but as a facilitator of self-learning. It should also help to define new relationship between the teachers and the learner.
- e. Technology usage must promote the principles espoused by the national curriculum as defined from time to time.

- f. Given the fact that we have 200 Mln children in elementary education, technology ought to be exploited in a manner that it successfully reaches the quality education issue for all these children

3) Technology for teacher education

- a. Today we have over 5.5 Mln teachers in 1.3 Mln schools and the training of the teachers is normally carried out in a centralized manner – in many cases using the traditional train the trainers – cascading model.
- b. Given the fact that current teacher training has failed to achieve results and is generally accepted by teachers as not useful, technology could well provide a significant support to directly reach certain quality training discourses in a significant manner – while retaining the flexibility of the trainer to use it in the most appropriate manner. Thus a vanilla approach of about 60% part of the content made available in the form of powerful audio-visual content and 40% contextual methods used by the trainer could prove very effective. Any elaboration on these percentages? Or we could say that these are two components of the teacher training processes, without mentioning specific %

4) Technology for Effective Education Management / Administration

- a. There is a need to develop a culture among the education administrators to use facts and data in a regular basis to make critical decisions in education as well as monitor implementation of several programs.
- b. A comprehensive information management system that provides such data and analysis to 1.5 Mln education administrators across the country based on their contexts and conditions will significantly enhance the quality of education delivery on critical issues such as mid-day meals, incentives, reaching text books, attendance, enrolment etc.
- c. Usage of technology among the administrators on regular basis is also known to develop the culture of analysis and responsiveness among the people who use it.

5) Technology for creating knowledge & networking centers for teachers and academic support staff

- a. The teacher education sub-group created for recommendations for the 11th plan had recommended technology enabled knowledge centers at cluster level to provide access of technology for accessing knowledge as well as networking. The recommendations need to be evaluated once again and experimented on pilot basis for their effectiveness.

6) Designing for success

Technology is an expensive investment and it is critical that it is used for pre-defined areas of objectives – if not specific goals. The failure factors already explored by the research need to be provided for in the policy framework itself. Some of the critical factors are:

a. Infrastructure

- i. Type of infrastructure
- ii. Quantity of and quality of such infrastructure – such as workable computers, key boards, projectors etc.

- iii. Guidelines for usage and deployment – e.g. how many children should at best use the computer at a time?
- iv. Adequacy of infrastructure is critical
- v. Inadequate infrastructure is as good as absence of such infrastructure

b. Infrastructure uptime and maintenance

The research clearly throws this up as critical issue since if the computer is not available for usage – it is a waste in investment

c. Electricity

- i. This is the single biggest factor preventing usage of computers. Unless electricity or alternative sources of energy are available, no infrastructure should be provided. MHRD should work with the ministry of energy, so that latter can r&d on energy sources for schools.

d. Teacher leadership

- i. The teacher must have significant role in deciding the technology and its deployment
- ii. Usage has to be carefully planned by the teacher and academic support must be available for informing the teacher on possibilities
- iii. It is established repeatedly that any implementation of technology without the leadership of teachers is a non-starter.
- iv. Teachers must have adequate flexibility to use the available technology including for developing local digital learning resources through their own or children's efforts.

e. Technology as a part of lesson plan and not a separate center

- i. Technology usage outside the lesson plan of the teacher has not yielded any results
- ii. The teacher has to decide how it would be supplement her overall learning strategy and technology in adequate form must be available.

f. Digital Learning Resources

- i. DLR must be available in adequate quantity and quality
- ii. DLR that merely provides digitized form of text books must be avoided.
- iii. Detailed guidelines for a good quality DLR need to be evolved. These need to be enabling guidelines and not eliminating or limiting guidelines.

Finally it is submitted that the entire issue of deployment of technology in education must be governed by the education agenda of the country and not by any non-education considerations.

Azim Premji Foundation