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THE METAMORPHOSIS

The traces of Information and Communication Technology (ICT) in schools in India can be seen as early as 1937, when All India Radio (AIR) used to broadcast educational programs for school children. In 1984, a project called Computer Literacy and Studies (CLASS) was introduced in Schools. As a part of the project, computers were introduced into 250 higher secondary schools. Primarily, ICT infrastructure was set up in an earmarked area within the school, away from the classroom. Students were brought in batches to visit the ICT centre in the school. To a great extent, ICT as a concept denoted the initiative of bringing technology awareness in schools. The purpose was to help both teachers and students increase their knowledge of technology, as well as their comfort levels in the use of technology. Over a period of time, it provided an opportunity to teachers to enhance their teaching practices.

An article by Victorio Tinio, titled *ICT in Education* states, “In recent years there has been a groundswell of interest in how computers and the Internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings. But ICTs are more than just these technologies; older technologies such as the telephone, radio and television, although now given less attention, have a longer and richer history as instructional tools.”

Over this decade, there has been a significant shift in the way ICTs are used, and a movement forward. The idea of taking technology into the classroom has metamorphosed into the concept of the digital classroom. It is a leap forward, but in a different fashion. Technology—either curriculum related or not—has gained a direct entry into the classroom.

A digital classroom is a technology-enabled classroom, where the entire teaching-learning process is made more interactive through the use of ICT. The term ‘digital classroom’ is however, somewhat loosely defined and means different things to different people. For a large number of schools in India, this has been taken to mean the installation of hardware or technology devices in the classroom. On the other hand, for a few providers, installing these devices in a classroom is seen as the ultimate outcome. Multimedia assets that are syllabus-compliant are seen as synonymous with digital content. This view of the digital classroom is the biggest disservice that can be caused to the entire ICT program.

Even though as a concept it is enthusiastically received, the digital classroom has raised fears of teacher redundancy in classroom learning. The definition of the digital classroom does not state how it will supplement the role of the teacher or accentuate the process of teaching. Rather, there is a focus on the benefits of hardware, with some components of the curriculum being integrated.

INHERENT CHALLENGES

A digitally enabled teaching-learning program is seen as having many benefits. However, research indicates that the learning outcomes are not automatic. In that case, one needs to ask two relevant questions:

- Is the mere installation and use of hardware a panacea for all teaching issues?
- Does viewing of media and use of other digital content guarantee a higher level of learning outcomes?

As per the excerpts from the studies undertaken by Central Square Foundation, “Introducing technology tools into a classroom does not improve student learning on its own. A classic example is Peru’s ‘XO Laptop Programme’ with its mission of providing one laptop to each child. Evaluations of this program in Peru indicate that merely providing hardware to students without a comprehensive strategy of incorporating technology into learning does not have a significant impact on student achievement.”

Another example that revealed negative results when technology simply replaced teacher instruction is the comparative evaluation of two interventions using technology in the same school in Gujarat in India.

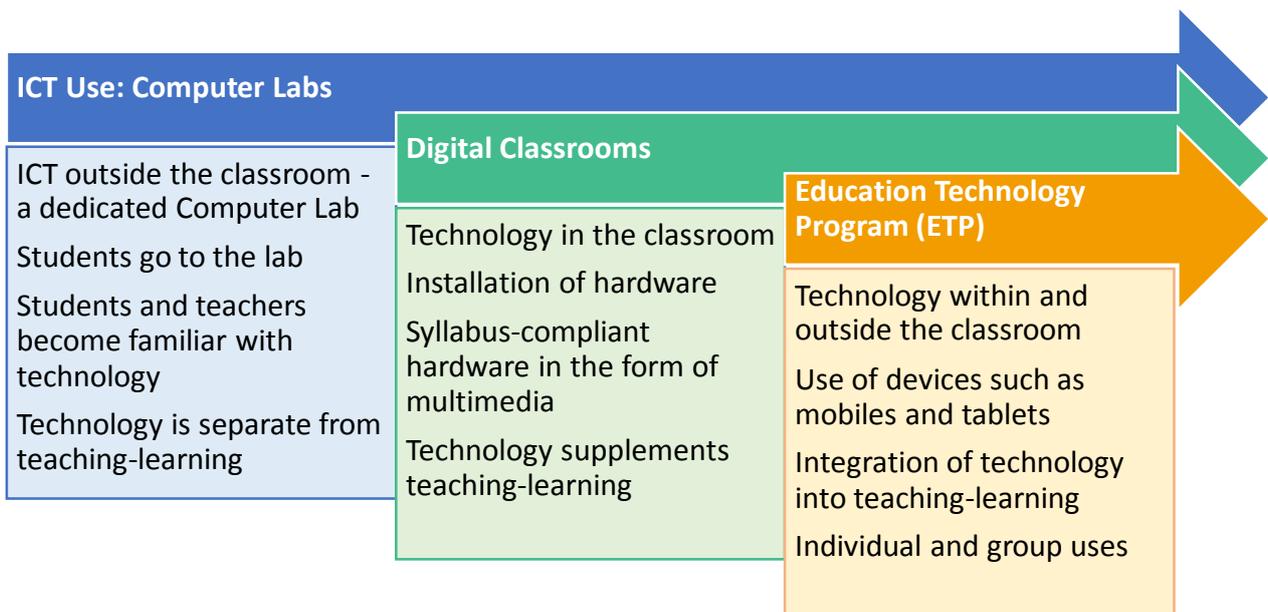
The report indicated that “The intervention where technology was used to reinforce teacher instruction produced positive gains, while the other one, in which technology served as a substitute to teacher instruction, resulted in reduced learning outcomes.”

It has also been observed that the mere display of content provided in a digital classroom cannot generate effective learning in the classroom.

AN INTEGRATED EDUCATION TECHNOLOGY PROGRAM (ETP)

It is critical to present educational content with a purpose so that it generates learning. Content should be presented in a manner that students at all learning levels can form connections with what they already know, and build upon it; learning experiences need to be designed around this content so that students can construct their own learning. In such a scenario, the teacher’s role is transformed from a mere deliverer of information to that of a facilitator of learning.

Thus, the need of the hour is for the digital classroom to evolve into an effective integrated technology program (ETP) which understands the varied needs of students in a classroom and empowers a teacher to deal with complex subjects and varied ways of learning in a classroom.



The recent avatar of the Education Technology Program (ETP) is a program that addresses the contextual challenges faced while teaching with the aid of technology. An ETP integrates the teaching-learning process and acknowledges the role of the teacher, as well as the learner.

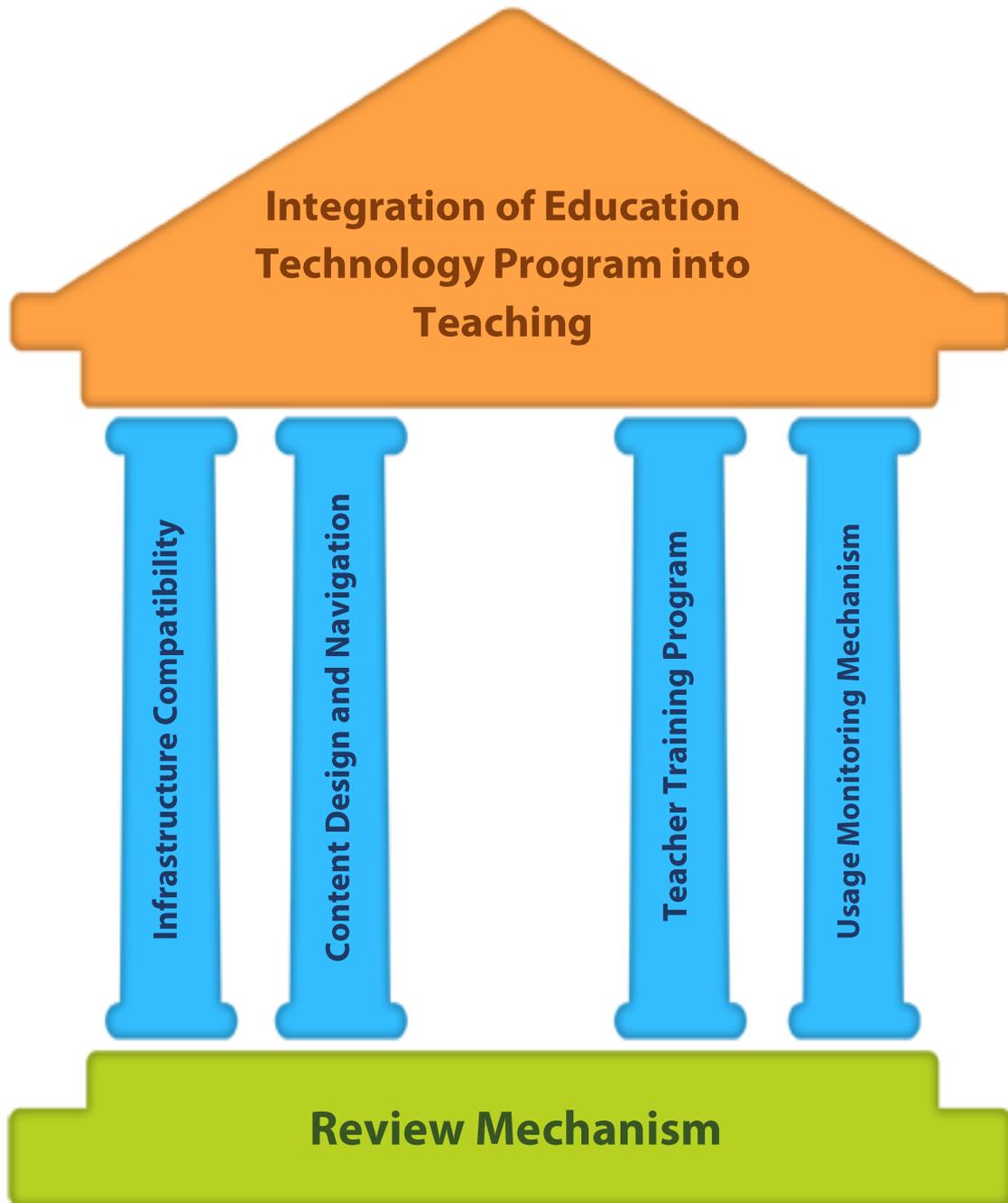
The design of an ETP should assist teachers in dealing with some very obvious but extremely tough challenges in the teaching-learning process. Simpler methods should be made available to deal with complex topics, which otherwise would take time and be difficult to explain in a conventional manner, thus ensuring that students with varied ways of learning can understand. In addition, activities designed to promote “learning by doing” should also be made available.

High quality question banks that enable teachers to design their own assessments should also be built. These can be used to create quizzes, question papers and any other form of assessment. The ETP should also include thought-provoking worksheets in creative formats that can be used in activities, as assessments or for the joy of solving them.

The ETP should include an authoring mechanism that will enable teachers to design open-ended, reflective questions for use in the classrooms. This potentially has the true ability to assess learning in the classroom. Teachers should be able to author all the material that they require – from quizzes that test the learning of concepts, activities, as well as entire lessons. This would go a long way in creating a comprehensive content repository.

The hardware in the classroom should facilitate a learning design experience. The power of a robust education technology program can be leveraged when it is aligned with the school curriculum, integrated into the teaching-learning process, and supplemented with relevant and sound technology.

Implementing an ETP requires a great amount of deliberation and planning and some key components need to be considered, which are vital for its success.



EMBEDDING AN ETP IN THE PROGRESSIVE SCHOOL VISION

“Schools that have successfully implemented an ETP, highlights the fact that the hallmark of a progressive school—other than having a physical infrastructure—is to have an articulated vision or mission statement” (Project ORE is an internal study undertaken to understand amongst customers, leadership styles and operating principles for effective product deployment.)

When opting for an ETP, careful calibration needs to be done to select the most appropriate design. The design should help institutionalise the creation of best practices and help in powering the school’s vision or mission.

A careful monitoring of ETP rollouts have demonstrated that wherever key conversations have been held with the school leadership prior to the roll-out of the ETP to agree upon the appropriate yardsticks to measure the value for money, and to understand the current teaching-learning practices, the program has been integrated into the school ecosystem with greater success.

Another critical success factor for an ETP is teacher training. Training should be customised to the school’s culture, and to the current pedagogical practices being followed in the school. In addition, sound technical, as well as pedagogical support to teachers, should be the foundation of any investment in educational technology.

Infrastructure Compatibility

Even though infrastructure constraints are systemic issues, it plays an extremely crucial role for the success of an ETP program. The overall infrastructure must complement teacher training in order to integrate technology in classroom delivery in the following manner:

1. **Selection of Classes and Learning Outcomes:** The sections or standards where a technology solution is to be installed should be carefully selected. This should be carefully tied in with the learning outcomes to be achieved through the use of technology.
2. **Identification of the Appropriate Server Centre/Teacher Planning Area for the ETP:** Project ORE study shows that schools give paramount importance to the earmarked nodal area within the school’s premises. Physical access to the Server Centre for teachers should therefore be carefully chosen. It should be located where it does not cause much deviation from the normal route that teachers take to their classrooms and back. This earmarked area should be cultivated into a centre of intense lesson planning and preparation for classroom teaching.
3. **Key Factors in the Choice of Devices and Classrooms:** When selecting the classroom where the devices are to be installed, the current noise levels, and the amount of light and ventilation should be taken into consideration. The classrooms should be kept as dust-free as possible.

Care should also be taken in the selection of interactive devices to be installed in terms of their quality, the price, and whether they can withstand long hours of use without overheating.

While it may not be possible to provide an entirely dust-free environment for the hardware, certain processes would go a long way to help preserve the equipment. This would include covering the devices after use, regular dusting, basic upkeep of the equipment, and most importantly, mitigation methods for the damage to the devices that can be caused by rodents.

4. **Electrical Equipment:** Overall safety and security measures have to be put into place when using technology, as devices are constantly plugged into electrical outlets. The first thing is to ensure that there is suitable earthing and electrical infrastructure so that the risk of fire is reduced at source. This should be supplemented by placing fire extinguishers at strategic locations, so that they are within immediate reach. Finally, staff must be trained on fire safety on a regular basis so as to be well-versed in using fire extinguishers.

It has been observed in schools that it is immensely valuable and infuses the appropriate level of seriousness among staff and students when school leaders lead by example and participate in fire drills themselves.

Content Design and Navigation

The ETP design should basically acknowledge the presence of various learners in the classroom and their individual needs. The activities provided must assist the teacher to achieve the higher order goal of teaching a subject. It should not only help learners acquire conceptual clarity but also develop a favourable attitude, and inculcate scientific habits of the mind in them. Overall, the ability of the program to provide a level playing field where varied types of learning needs can be addressed in a diverse yet single classroom is critical.

- It has been noted that features that provide teachers with different ways of introducing a new topic at the start of the lesson have a significant impact on teaching a topic. The ETP design should provide a more creative alternative to the teacher to engage the students, so that not-so-effective ways of beginning a new topic at the start of the period can be replaced with methods that hook the attention of students and make them want to learn. For example, behaviours such as demonstrating authority by using phrases like\ ‘Pin Drop Silence!’ or “Be Quiet!”, or actions such as banging the duster or screaming at the class to gain student attention can be replaced with a quick game, a short quiz, a few thinking questions, a video clip and more.
- The ETP design should have the flexibility to enable the teacher to choose the method that is most effective to teach a topic. They should be able to handpick the assets and decide the flow and sequence of the resources provided. The teaching aids provided should provide a platform where students can discuss, think critically and participate in activities; methods that enable a

teacher to conduct a lesson based on evidences and argument rather on the mere authority of having the power over students in a classroom.

- An effective ETP weaves in inter-disciplinary learnings that enable teachers and learners to make relevant links across the curriculum beyond the topic or point being taught—links that also find application in real life. For example, something like the simple but powerful concept of Zero introduced in elementary Algebra should be linked to other branches of mathematics; it can also be related history, where you discuss how this concept evolved in India.
- The ETP design must enable, encourage and drive teachers to contextualize the concepts to real life situations. The ETP should be designed in such a manner that individual teaching practices are captured and institutionalized in the form of knowledge repositories for the school. This would enable the school to create a culture that can promote collaboration amongst teachers and increase the intellectual teaching capital of the school, placing it among the front-runners in education.

Teacher Training Program

In an ETP, the teacher’s role remains integral to the teaching process and, in fact, expands to take on new aspects that are different from the traditional.

Powerful insights have been gained on how the Teacher Training program should be designed and executed. The Teacher Training program should go beyond explaining the ‘product’ and aim at building a positive perception among teachers towards technology use. Often, it is a resistance to change and to accepting new ways of doing things that affect the success of the program. Hence, one should begin with the assumption that each teacher needs to be coached so that they are ready to integrate technology into teaching. Once mental readiness is established, targeted training can be provided to teachers

For the ETP training to be a success, it is very important to map a teacher’s current level of digital competence. It is been observed that teachers from different age groups and from different social backgrounds have different motivation levels to use technology in the classroom.

It is essential to ensure that detailed and intense conversations related to current existing teaching processes are undertaken and recorded with the school management so that progress can be tracked.

Program Design:

To begin with, an ETP teacher training program should focus on obtaining teacher buy-in by demonstrating the power of technology in key areas of the teaching-learning process, and build a high positive perception towards technology use.

The ETP teacher training program must focus both on raising digital competencies and the pedagogical applications of technology. It should use immersive techniques in a participatory environment. Thus, practice sessions during implementation play a key role in helping teachers learn how to blend digital

competencies with subject pedagogy. These should be supplemented with other professional skills such as facilitation, active learning techniques and so on, which enable a teacher to become an effective participant in the ETP, and then an advocate of the ETP.

When designing the program, evidence suggests that analysing and identifying the training needs of a school plays a key role in the success of the program. Designing a customized training framework would enable teachers to receive training which considers what they already know and what they need to know. The post-training process should help teachers to imbibe the culture of planning and measures the time spent by the teachers for the same. The key to success lies in a mechanism which measures the degree of integration of technology into classroom practice.

Diagnostic training interventions must be included in the program. These should recommend appropriate practice sessions for identified teachers to raise their levels of participation and usage of the ETP. These interventions should be undertaken broadly in the following three areas:

Diagnostic Training Interventions



Critical Success Factors for ETP Adoption:

Integration into the Time Table: This is one of the elementary but often missed requirements to ensure a seamless take-off. In schools where an ETP is in place, time must be allocated for each teacher to prepare and practice for classes to be held in the following week.

The selection of the assets to be used requires some amount of deliberation. Rather than just selecting multimedia, teachers should make it a point to select assets that require higher student involvement—such as quizzes and activities; this will lead to high student engagement and retention of learning.

Apart from careful selection of assets, teachers should spend some time practising how to use technology and how to integrate it into their teaching. These practice sessions will help teachers gain ample confidence to use the hardware seamlessly and to retrieve or locate content that is relevant to their daily teaching within the classroom.

It has been observed that schools which follow the “prepare and practice” method have a far more effective utilization of the overall program.

Enhancing Classroom Delivery: The extent to which teachers incorporate digital technologies into classroom pedagogy depends on a variety of factors such as support from the seniors, confidence levels, motivation to use technology, levels of competence, and so on.

Time spent on initial practice sessions is associated with a faster rate of adoption of technology by teachers in the classroom. When teachers experience success when using technology for the first time in the classroom, it gives a fillip to their confidence levels. They feel encouraged to then try and use more of the offerings in the program.

At the same time, some of the fears and apprehensions that teachers may have of failing in the classroom where students have very high digital or media exposure need to be acknowledged, and teachers should be coached to deal with such instances. Adequate support should be made available in the classroom to these teachers when they conduct their initial ETP sessions.

Resource Person: During the initial phase of the ETP rollout, the school would be considerably dependent on external service providers or consultants. At this preliminary phase itself, the school should begin the process of building internal capabilities to drive the program, so that the transition to an independently running program is made smoothly. This would undoubtedly lead to a value creation for the school in the long run. The school should identify mature users and develop them as internal coaches or experts who can support the other teachers to develop their capabilities and participate fully in the ETP.

Usage Monitoring

Every program that is implemented requires adequate monitoring to ensure that the objectives are met, issues addressed, and corrective action taken. Monitoring thus becomes a key part of the change management process in the adoption of the ETP. This aspect of the ETP requires the demonstration of appropriate leadership to ensure that change is ushered in without any intimidation. For this, it is

important to put in place a recognition process that is both transparent and public. A monitoring mechanism that does not include recognition can result in limited impact.

Recognition for the Initiators: In *Tipping Point*, Malcom Gladwell makes a relevant point in this context: “What must underlie successful epidemics, in the end, is the bedrock belief that change is possible, that people can radically transform their behaviour or beliefs in the face of right kind of impetus.”

In the initial stages, extrinsic motivators are important to speed up the adoption process of the ETP. Institutionalizing a pat on the back for some of the enthusiasts who adopt the digital platform faster has an impact on the rest of the group. Hence, putting a recognition program in place, even if it is a non-monetary one, will go a long way in establishing the foundations of the ETP.

As teachers adopt technology and experience success, their own motivation to explore and use technology will drive them onwards. At this time the parameters on the basis of which they will be recognised need to change. The focus should shift to demonstrating expertise, resource creation and collaboration. Thus, eventually, the recognition program should shift teachers from users to competent resource persons, from individuals learning how to use the systems to high level collaborators, and from consumers of content to creators of a knowledge management repository within the school.

This combination of a repository of resources, coupled with expert teachers who collaborate and create should be the hub of generating best practices, a Centre of Excellence within the school. This COE can be used to bring novice teachers on-board the ETP by reducing their learning curve and putting them at ease since they will have the access to the best teaching practices within the school. Thus, the process of recognition itself should mature hand in hand with the time span of the ETP itself.

Review Mechanism

A structured review process would help in identifying the course corrections that would be required for varied sets of teachers. Along with the frequency of the review, it is important to analyse the following aspects:

1. Type of assets that are being used by the teachers such as activities, multimedia etc.
2. Teachers contribution of content to grow the school’s repository
3. Understand reasons of non-usage
4. Capacity utilization
5. Levels of incremental progress attained over a period of several academic cycles

The interventions then should be planned keeping in mind the above parameters and its relevance in the academic session.

CONCLUSION

The following parameters must be considered while analysing the role of a successful ETP in a school, other than measuring the most obvious parameter—a student’s performance or marks scored:

- To begin with teachers should be asked if they find the program assisting them in dealing with complex topics far more effectively. In addition, how does the ETP help teachers to find ways to beat the monotony of dealing with repeated topics? This is possible when they are able to add their perspective to the content, contextualize it to the relevant environment and leverage effectively some of the relevant open resources available on the web.
- The school must capture the extent of the knowledge repository that is created for the school, where key teaching nuggets have been created for the institution by the teachers which represent the most effective way of teaching a topic.
- Qualitative assessments with students must be embedded within the system in order to know whether the concepts are well understood, and how confident are the students’ in relating the concepts to real life situations.
- Visible improvement in the interaction levels in the class.

Overall, it is very important for the school to honestly reflect on how well they leverage the Education Technology Program to redefine the role of the teacher so that it evolves from being a “sage on a stage” to that of a facilitator of real learning.

The ETP, when well embedded in the schools ecosystem, has the potential of creating immense value to all the key stake holders within a school. In Project ORE Study ,it was observed, 92% of the principals interviewed noticed that there has been a very positive change and enhancement post the effective implementation of the ETP. Substantial improvement in student attendance and performance was attributed towards the program. The overall in-class student participation improved dramatically. What is fascinating is to observe that it has an impact even on raising the interest levels of the teachers to try to explore and bring in new ideas into the teaching-learning process.

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