

## **The Barriers and Solutions for eLearning Systems To provide equal access to Educational Content**

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*Equal Access – Enabling all members of community regardless of technical ability, access to educational content*

*Choosing the appropriate technologies to deliver true equal opportunity access to educational content in rural and regional communities in developing countries.*

### **The Barriers**

In Thailand, the rest of Asia and near Asia, where the majority of the world's population resides, the majority of people do not live in large cities; they have limited access or no access to eLearning. However these are the people that need access to knowledge and education as a tool to give them the power to enrich their own lives, and allow governments, private organisations and NGO's to assist them and provide services.

eLearning should be a perfect tool for this but has failed to deliver due to the focus on internet only based solutions, rather than exploring numerous other alternatives.

Alternatives are required that enable remote communities to access educational content through digital technologies that are not reliant solely upon PC or Internet access.

In this paper we will explore the alternative methods to use to provide people to broadband access to content. Providing a broadband solution without requiring massive infrastructure support and the trade offs for using this approach.

Firstly though, we need to understand why Internet based learning failed. Simply expressed, Internet based learning fails to take into account the lack of three main ingredients for it to succeed in rural and regional locations.

### **1 Access to Broadband Infrastructure,**

Quality eLearning is often media rich; by this we mean a mixture text/diagrams/video content. Learning Management Systems "LMS", the software tool often used to both deliver and monitor a student, also often requires the monitoring and pulling of large amounts of content or data via the internet.

Without broadband access, internet based applications that are media rich will never make their way to communities they are; simply too large for narrow band access, or there is simply NO telephony access available.

Even with narrow band access, even if available, cost of monthly access is also a barrier, as it is outside the purchasing power of members of disadvantaged communities.

The alternative is for government to bear the cost of providing Broadband infrastructure to remote locations, especially in the areas of most need. However cost of building a broadband infrastructure is also often outside or beyond the financial abilities of many governments. Therefore alternatives

need to be examined on how to deliver Digital and Educational Content.

## **2 Access to PC's and Training**

Without access to PC's and PC training, then obviously internet based learning cannot take place.

Rural and Regional communities in many countries do not have access, so the cost of PC's for individuals is still too high, though it is dropping rapidly.

Often the location of these communities are so remote, even with government support for the distribution of PC's, providing PC's to the community members can also fail unless technology support exists in the communities. This "Technical Support" is required for when the PC will breakdown. In these areas, it is not as simple as walking down the street to a PC repair shop. PC's are subject to difficult working environment with intermittent power supply and harsher conditions than normal.

## **3 The PC as a barrier to eLearning**

The greatest problem we face is the PC itself! Even when available in remote villages the PC is a barrier to learning, and requires scrutiny to appropriateness as a tool of learning.

For example, in many communities, a "cheap" computer is still the equivalent of 6 months wages. There is a very real fear, "If we invest in this, what happens if someone breaks it?"

Culturally, we have often seen in education and business that many of the community leaders do not want to be seen as being unable to use the PC.

Additionally, the PC itself is a barrier in that many people will never become computer literate enough to be able to use it as a tool. Or the PC will never be part of their daily life. This is just as true in the west as in the most remote village.

In these scenarios, we refer to the members of the community, often over the

age of 15, who already have jobs, or responsibilities, and will never have the time to learn to use the PC, as those needing to learn how to type and to be able to access content. They will struggle to catch up with the younger members of the community to become Computer literate.

However, should they be disenfranchised from access to educational content, be unable to access educational material that can immediately provide them with better tools to develop their lives? Should we keep these members of the community outside the technologies such as LMS's that can monitor their learning progress and provide educators with feedback on their learning and what additional assistance they need?

The basic problems can be summarized as lack of access to content and providing other technologies such as TV and Radio to co-exist with PC based eLearning.

## ***The Misleading Nature of "Live Delivery"***

Here is one other reason for the failure of eLearning to deliver on its earlier expectations. Not just internet based eLearning has failed to deliver, but many other forms of eLearning have also failed to allow equal access to content by all members of society.

The insistence by content providers to produce live content, (which we acknowledge as being important), is a main barrier to equal access of content.

Live learning, which endeavours to simulate a classroom environment, fails to take into account the true definition of "Distance Learning".

Distance learning is not about kilometres, it is about access. In Australia, many of the students of distance learning live in the heart of the cities, within almost walking distance of educational facilities.

However they are undertaking educational programmes to improve their lives, to embark upon life long learning

adventures, and have limited time to access “Live” classes in their own city.

They choose distance learning because it gives them the ability to learn, “When they have time to learn”.

In remote villages, if people are forced to take part in “Live” classes by any eLearning technology, then the member who often most needs educational tools to improve their lives will be disadvantaged. The emphasis on “Live” delivery disenfranchises members of the community, especially along wealth and gender lines.

### ***The Alternatives***

Clearly then, technology that utilizes other mediums that are familiar to the community is what is required, to build a real bridge over the digital divide. Technology that also provides a road map to eventual complete PC literacy while supporting that difficult learning curve.

### ***The Digital Library***

Sat-Ed, IDC and with support from iPSTAR have developed a technical solution for this problem by developing what we call a low cost “Digital Library”.

The “Digital Library” is exactly like a normal library; it is a repository of knowledge. And like a normal library, it needs to be managed; the content updated regularly, and most importantly, listens to the community that uses it for what that community requires in its library.

### ***The Digital Library Management Control System***

The system involves using Satellite Bandwidth to “Push Forward” content that can be accessed by the members of the community as often as they require.

The content can be sent from one “Head End”; however, the content can be developed at multiple sites.

Rather than pulling down again and again the same content, the content resides in

the “Digital Library”- in the village.

Because the content is “Pushed Forward” it is always there in the library, there is no need to wait, they will have real broadband access to content without the need for telephone access.

Like all Libraries, content needs to be protected, so the system utilizes Digital Rights Management (DRM) to stop unauthorised access or copying of content.

Like all learning environments, the teachers need tools on how to create content, and how to monitor the student’s progress. Even “Free” education requires that student’s progress is monitored so we can support their progress.

And like all educational environments, examination is a key part of monitoring a student’s progress. The Management system provides an encrypted delivery service so that exams are not able to be viewed until the appropriate time and place.

### ***The Interface***

There are three types of technologies that the Digital Library can use to access its content.

Firstly, there is the TV, a common device in most if not all villages. The TV is one “Interface” between the “Digital Library” and the student. TV allows for the content in the library to be accessed by a simple remote control, identical to those found in all villages, that controls a VCD player.

On the TV screen attached to the “Digital Library”, via a small Set Top Box (STB), is a list of the “Content” available. The user simply points the remote, arrows up or down, selects and plays their lesson.

By punching in an ID number at the beginning of the content, the Sat-Ed LMS can then track what the viewers watch, how long they take, and can even provide a “Examination” at the end of the session, allowing, very importantly, for the content developers (and students) to grade and award

merit for courses undertaken.

During the lesson the content can be stopped, rewound, paused, and played again and again as often as the content provider allows (in the case of an exam, obviously the content may only be played once).

The action of the student being able to pause and play again the lesson takes away one of the claimed benefits of “live” delivery over “cached” content. “Live” delivery allows a student to ask questions; however, often by being able to firstly draft the content so as to pre-include common questions, and importantly allow a student to “rewind” their teacher, comprehension is greatly improved.

By using quality video based training content, the resolution on a large TV is better than that on a small PC monitor.

The TV, a device found in all villages, can then become the medium to teach people not just a variety of lessons, but also how to use the PC, along with support obviously of a facilitator at the site.

The TV is a medium that can “Teach” a larger number of people, and is cheaper to deploy than a PC. Typically only 2 – 3 people can use a PC at one time, 10 – 30 people can easily be part of a TV-based class.

### ***The Progression between Technologies***

The PC though is essential for any one to graduate to a full member of the “Digital Society”.

Using the PC, government can offer e-government services that would be unable to do so in these remote and technically challenged areas.

Classes from many different institutions can be stored and accessed.

PC’s offer an easier form of interactivity than a TV would, and have more LMS based content available.

And most importantly, PC’s are the device that will offer full employment opportunities in the future, as they paly a role in more and more industries.

The Sat—Ed/IDC “Digital Library” allows up to 50 different users to access PC based content at any one time.

PC’s connected to the device can experience a full “eLearning” environment complete with student monitoring and examination flowing back to the content provider. Media Rich content can be sent, without worry about the time delay accessing the content compared to narrow band (or not at all).

However there is always the need for true interconnection with the rest of the world. The “Digital Library” uses the iPSTAR satellite network to provide an affordable solution to interconnectivity.

Live connectivity allows students to “Chat” at specific times with teachers, to send and receive email, and communicate with other students to compare their experiences and suggestions.

The use of iPSTAR allows a reasonable size of interconnectivity; however, it also recognises that “pushing” content is a better use of bandwidth availability.

In Mexico, the K12 system chose the IDC solution over that of “live” solution vendors as it gave the schooling system a greater flexibility over content by “Pushing” content forward, rather than a live 24x7 system. The same amount of Bandwidth was used, but is used better!

The Sat-Ed/IDC Digital Library solution provides a mixture of both “Pushed Content” stored in the library, and “Live” access when required.

By being placed in a central location in a village, a “Digital Library” with one or more TV’s, and four or more PC’s attached, the system will provide all members of a community with true equal access to digital content. The system can even be deployed to become self-sustaining financially.

Content can be developed that will enrich the lives of all members of the community, not just those with PC access or skills, but all members of the community,

and importantly, as it is a repository of knowledge, allows the users to access the content at times that are available to the student to learn.

Content can be developed for use by number of mediums to deliver the knowledge.

In Laos, the verbal story telling tradition is very strong, and the Digital Library will use a small radio transmitter attached to play out material.

In Thailand, the “Visual” tradition is very strong, and this allows for the TV to be used as a device to deliver knowledge, and also be a bridge to the PC being used as a medium.

The “Digital Library” provides a number of solutions to delivering a better “eLearning” environment, as it overcomes:

1 The lack of broadband access

2 Provides a number of technologies already easily used by communities to access content such as TV and Radio.

3 Uses “Digital Library management” technologies to train and support the infrastructure requirements. It can provide a LMS for TV use, to monitor student progress, while providing a knowledge centre, a true library in the heart of any community.

### **The Real Problems?**

The real problems; however remain that too often technology drives the content creation and the methodology of interaction.

What we are trying to propose with the Digital Library solution, is an “Open Platform” that would allow numerous other systems to use the technology to deliver too remote and regional sites.

Obviously the technologies that deliver the most efficiently, and cost effectively would succeed and thrive.

At the end of the day, what ever technology is used, it should be as transparent as possible.

It should be so simple and easy to use that the students focus is on ‘Learning’ NOT on how to use the technology.