

# Tackling the Issues about Educational Technology

## Development in Asia

### (Infrastructure, Info-Structure and Info-Culture)

**Author: Steven McKee, President,**

**Labtech International Ltd ([www.labtech.org](http://www.labtech.org))**

In this article I would like to share some thoughts and observations about the challenges of implementing educational technology programs in developing countries, particularly in Asia. We all know that this is a great challenge that is fraught with pitfalls and strewn with many failures and partial successes. Many countries are struggling to update their educational systems around the world and to incorporate new ICT technologies that have been emerging and harness them for the benefit of teaching and learning. Vast sums of money are being thrown at this area often by countries that cannot little afford a failure. Budgetary resources are scarce and difficult to come by and it is up to all of us to see that they are effectively implemented as best as they can be.

In Asia we see initiatives in educational technology on a regular basis as countries try to keep their educational system updated. The guiding figures in national educational policy and development understand correctly that this is a key issue. The youth of today are connected in new ways and have new learning habits that our educational systems were not designed to handle. Furthermore, the teachers are ill prepared for these changes as many are uncomfortable with technology and they fear its use and perceived problems.

There are some brave new and bold initiatives throughout the S.E. Asian region and I shall provide only a few examples for illustration purposes. Thailand has recently launched a major initiative to eventually provide all school children with tablets throughout the country. This is likely to cost them close to a billion dollars by the time the program is completed and that is only for the hardware. Although very welcome, typically these programs are often politically inspired (rather than educationally driven) and there have been many complaints in the press from students, parents and teachers that although the tablets are liked, the program implementation falls short of potential possibilities. What could they have done better? Read on....

<http://www.bangkokpost.com/news/local/359846/the-tablet-project-one-year-on>

Malaysia has a long history of educational technology initiatives starting with the SMART Schools that began many years ago. This was added onto by large nationwide programs that put in new multimedia labs in almost all schools but there were problems with software, content and use of the labs. Lately, they have been doing a massive upgrade on the school bandwidth access and network system and that is coupled to the launch of a new Virtual Learning environment for Students. I have learned a lot from the Malaysian program from studying both their failure and successes and have come to realize several things. One is that there is no single program that will provide all the solutions to this problem. It requires a broad multi-prong initiative that together covers all stakeholders and participants who need to be engaged from several directions or programs. Also you have to couple all initiatives that involve new technologies with adequate teacher preparation and training otherwise the programs will fail.

Singapore has often fared well as they are a small country with a strong financial position and are not afraid to invest heavily in education and educational technology. They have recently launched last year a new program for teacher

development in the 21<sup>st</sup> century called TE 21. This is an admirable initiative and has the usual Singapore twist as they tend to do things their own way and often not in ways that can be replicated in other countries due to cost, command and control issues. <http://www.nie.edu.sg/about-nie/teacher-education-21>

Indonesia has also been forging ahead as well as it can and has some surprising success with the move to online learning. This is a very suitable vehicle for Indonesia to explore as due to the logistic problems of being a vast archipelago, this could have the potential to finally deliver good quality distance learning to all parts of the country. Indonesia also seems to take to technology, especially social media, where they are the world's third largest user of Facebook and the fifth largest user of Twitter. But of course they face large challenges in transforming the massive amount of schools that they have but they are quite innovative and so there is hope.

All these initiatives require time and large sums of money that are thrown mostly at the hardware issue. I have seen many initiatives falter and fail to reach their potential due to poor planning and a lack of realization that educational technology is more than about putting new hardware or bandwidth into a school. It has to be made useful and meaningful for teaching and learning and that requires the participation and support of the teachers, provision of adequate and matching software and a changing of the teaching and learning styles in the schools. Altogether, I characterize these elements as the 3 "I"s: Infrastructure, Info-Structure and Info-Culture.

Infrastructure of course is the computers, PCs, Laptops, tablets, school internet access, network system and the like. This is what most development projects concentrate on and spend their money on. We certainly need these things in the schools and lots of them but by themselves they are incomplete. We also need Info-Structure, this is the programs, applications, Apps, learning content, Learning Management system, internet protection, Classroom management system and all the software that makes the hardware run. Without this the hardware cannot work. But even when the first two are provided adequately we often still often see that the programs are less than successful and their use in the classroom is not as we had hoped.

That is where Info-Culture comes in and this is the missing piece of the puzzle. This is the ability to understand and use the technology for the purpose of teaching and learning. What this involves is the training programs and support systems for the teachers, 21<sup>st</sup> century Pedagogy coupled with learning programs and learning platforms for the students, community and support sites that share best practices, lessons plans and even content that is created by both teachers and perhaps more importantly students. Info-Culture is the glue that holds the first two together and makes them work. However, it is often forgotten, neglected, under budgeted or really not even realized what is missing.

In order to achieve true and sustained success in implementing educational technology, I would recommend that future educational development projects divide their budget up into these three parts in a balanced manner. For example, 60% could be spent on Infrastructure, about 20% on Info-Structure and about 20% on Info-Culture. Don't let the vendors skew the budget and convince that that more hardware will solve all problems, as hardware cannot work well without the other two. And in my opinion, Info-Culture is the most neglected and in many cases not even perceived at all. Yet it is the most significant and possibly the hardest one to implement of the three and could benefit from a lot more attention. It can kind of be seen as an insurance policy to ensure that the development program is successful and that the money is not wasted.

I had a meeting last year with a senior official from a Ministry of Education that confided his problems to me. On a recent project their country had spent hundreds of Millions of Dollars on upgrading computers and networks in a great many schools. Yet a year or so after the investment, inspections at the schools verified that the equipment was not being used as nearly as much as they would like. In fact, in a number of schools the computer labs were empty.

The dilemma was that this was a big investment for their country and one not to be taken lightly. If this project was not successful then how could they justify additional investment into educational technology? The problem was clear, the project planners focused only on the first “1” and neglected the other two. But this can be corrected by future well balanced programs, so there is hope.

Another issue is the rapid change of technology and the problems it causes. We all know the difficulties that we face when operating systems change, hardware changes and the like. The ever marching pace of Innovation is dizzying. Often projects do not adequately plan for technology obsolescence and do not factor it into the future scenario and their planning. It is a fact that schools and Ministries of Education are ill-equipped and ill-prepared for the constant fast pace of change. Schools and teachers for the most part are uncomfortable with change. What could help is a new form of teacher training and support in which training and courses are given over time to support both teachers and administrators in how to deal with this. I have seen Communities of Practice which are web based to help provide long term support and exchange of information. Robust and evolving teaching and learning platforms need to be created to remain more stable than the hardware and implemented over a longer horizon. In addition, we need to get the teachers helping each other and sharing information resources that they may each have which foster building of a support community. The Ministries cannot do it alone; it is everyone’s responsibility including teachers, administrators and even the students (after all it is for their benefit).

An interesting possibility under much discussion at this time is the Bring Your Own Device (BYOD) concept. This could offer a partial solution to reduce the problem for the schools. It is almost impossible for the schools to consider replacing the learning devices every year or two; it is just not possible to do so for both budgetary and administrative reasons. It seems to be that these devices are becoming more “personal” in that they really should belong to the user and not the school. Mobile Phones and tablets are spreading so fast that in the near future the majority of students will own one, many have them already. This is a good thing as the device can be used by the person as long as they want and they determine when it will be replaced. This could remove a huge burden from the educational system that it is currently struggling with (like Thailand). If the majority of students owned their own devices, the government could then use their budget to assist the disadvantaged who may not be able to afford it, or there could be loaner or even finance programs. That would also mean that the schools would now concentrate on the facilities for learning such as the network system, device management systems, learning management systems and of course the content. With this burden reduced, the schools could focus on creating robust learning platforms that can accommodate a wide variety of devices and integrating them into the teaching and learning process.

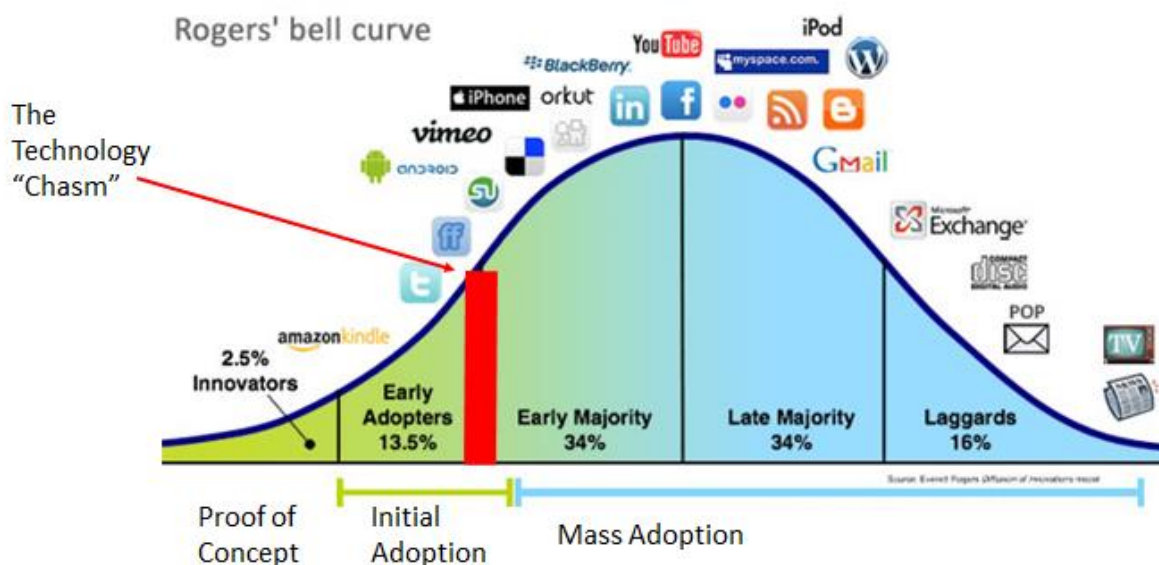
Often Educational Technology is confused by many countries as teaching a technology course on how computers operate. Of course that is a beginning and you do need to understand something about computers to use technology. However the main point is that we want to use technology for the process of learning. Now and in the future, our children will be using the most powerful educational tool ever created for their continued learning and information resource; the Internet. In my opinion, educational technology is about students using technology for learning and by that I mean life-long learning both in and outside the classroom. They not only need to be technologically proficient but I prefer to think of it as they need to be technologically fluent. Technology is not something that we just teach the kids but has become one of the primary life-long learning tools. I often identify its importance with reading. We teach kids to read at school but we don’t stop there do we? No of course not, we have the kids continue to use that skill throughout the rest of their life in order to find and learn new information – it is a life-long skill as well as a habit and so is technology, they are just the same.

All these wonderful tools and technologies really hold a promise of changing and improving education. Not only do they provide the tools with the ability to distribute learning to a wider audience at less cost than before but also to make it more engaging and student centric. With better learning platforms we can start to differentiate learning to

meet the varying learning needs of students. The reorientation of the class away from teacher centric to student centric is a key component to making the new technology work. Problem based learning, Project Based Learning, Learning by Discovery and constructivism are all good teaching methods that are utilizing the new technology to increase interest, participation and creativity. The new standards coming out for 21<sup>st</sup> Century learning Objectives are admirable and we all wish our students were proficient in them. I think the International Society for Technology in Education's (ISTE) National Educational Technology Standards (NETS) are a good international benchmark for these skills. ([www.iste.org](http://www.iste.org)). They have great standards for Students, Teachers, Administrators and even Technology Coaches that show what needs to be done in order to make the whole Info-Culture element work. I work quite a lot with ISTE and their concepts and find them to be the best thing around in this area that addresses the issue of implementing Info-Culture. At my company, Labtech, we have a number of new educational tools programs that are being trialed and developed for schools to implement these standards in Asia and the developing world. Malaysia has recently set the goal in their new National Education Blueprint to benchmark all their teachers against the skills required by the ISTE NETS for Teachers. This is a great initiative that other countries could join in with and build a region wide community and support.

So where to start? One point I think that educational administrators both on a local school level or a national level could look at is the Technology Adoption Curve. This is a very useful tool for use when implementing new programs. It works on the concept that not all people use new technology right away and that there is a natural progression of users that join in at various times which matches with their predisposition and capabilities. You can see in the diagram below that it starts with innovators who are followed by early adopters. If it is successful up to that point, it may possibly be sustained through to early majority and if it makes that far it should carry on to the bulk of the other people not yet using the systems or technology (the late majority and laggards).

## Technology Adoption Curve



(Rogers Bell curve for Technology Adoption Curve modified from [www.designdamage.com](http://www.designdamage.com))

The problem is that many programs or initiatives stop around the early adopter phase. I have seen this many times before and it could partially have to do with who the early adopters are and how successful they are. If they are not good enough or willing enough, the program will fail. This potential failure point is called the "Technology Chasm".

The lesson for us all is how to introduce a new program or initiative and maximize its chance for success. I think that one factor lies with trying to identify and encourage the first three groups and to find ways to aid them to enhance their chances for success. We can apply this to teachers when introducing new programs. The key activity at this point would be to do an assessment (profiling) of the teachers on their knowledge of technology, their comfort levels with technology and their willingness to try new things. This potential group could then be asked to join in and participate on introduction and trialing as well as subsequent implementation of new systems and programs. This would greatly improve the chances for success in project implementation. Too many times have we participated in new trialing programs whereby the participants have been appointed by some person and mandated to “do” the program. Inevitably we end up with a coalition of the unwilling, possibly consisting of an assembly of mostly late majority type persons or even laggards who do not really want to be there or do that. So with good profiling we can assess and identify a coalition of the willing that can help the new programs chance of success.

At Labtech we are developing new 21<sup>st</sup> century teacher assessment tools and systems that can assist in this process of identifying teacher preferences, skills and knowledge which are keys to success as well.. This development work is being done together with several key University partners from the USA and Asia. We hope that these new tools will provide assistance to both schools and Ministries in addressing their implementation of new programs and staff development needs.

I will leave you with some further thoughts about recommendations and best practices that I have seen or participated on:

1. Schools, Teachers and Ministry staff should engage internationally to seek and share best practices. Join up with and support international organizations in this topic area.
2. Benchmark against ISTE and other organizations that provide insight into new teaching and learning skills. In fact teachers and schools can join ISTE to receive a wealth of information.
3. Do assessment of teachers (skills, knowledge and attitude) and integrate this into the Professional Development framework for 21<sup>st</sup> Century skills. Keep in mind the Technology Adoption Curve and use it to your advantage.
4. Upgrade teacher pre-service training programs to include educational technology and the new pedagogy which is starting to resemble more like andragogy.
5. Create teacher in-service training programs to upgrade existing teachers and create an on-going sustaining on-line community of best practice for support as this process never stops.
6. Spread new information and get teachers connected to outside sources for their own learning and development. Teachers need to practice Life-Long Learning themselves and not be afraid to share this process with their students.
7. Administrators should consider conducting training before putting new equipment or systems in the class. New equipment and Systems or facility upgrades could be used as rewards for those completing the training. If they can't complete the training then they don't get the new things which would be a possible waste if they cannot use them. This would ensure resources are used by those who can put them to best use.

**About the author:** Steven McKee has been working in international education for over 35 years in developing and newly developed countries. He is the President of Labtech International Ltd. ([www.labtech.org](http://www.labtech.org)) which he founded about 25 years ago and it has become one of the premier innovative technical education companies in the world whose training systems are in use in over 70 countries. He travels extensively to view schools, educational initiatives and to meet with educational officials at all levels in many countries each year. This provides him with a unique

platform from which to observe educational development over a long period of time. In recent years he has been increasingly concerned by the struggles of many countries in dealing with the issue of educational technology and has set out to try to assist and advise where ever possible to share best practices from around the world. Labtech is based in S.E. Asia and he lives in Indonesia and Mr. Mckee serves on the Executive board of World Didac. Email: [steve@labtech.org](mailto:steve@labtech.org)