

Technology and education: getting the balance right

OVERVIEW

SINGAPORE has been trying to build a world-class learning habitat, and in recent years has shone a spotlight on technology as an important enabler of its vision.

But while technology is seen as a boon to educators, its effectiveness – like any tool – depends on how it is wielded. And as with any technology, end-results will depend on a range of factors ranging from user know-how to supporting infrastructures.

How can educators and tech vendors achieve the right balance between high-technology and effective teaching? *The Business Times* spoke to a panel of experts to find out their concerns and strategies.

Ong Boon Kiat: When does technology become a hindrance to the teaching and learning process?

Koh Thiam Seng: Three scenarios come to mind. Firstly, when the focus is on the use of technology rather than on learning. Secondly, when the teachers are not ready to use the technology. And thirdly, when there is inadequacy in terms of infrastructure, bandwidth, digital content and technology support.

The focus of educators should be on learning, specifically the kind of learning they want to bring about, then they can figure out which are the best technologies to bring in. Very often, it need not be the latest technologies in the market. It could be something as simple as Microsoft Word, which will allow students to, for instance, re-word their compositions very quickly rather than on paper.

If you take this one step further, it could be going to, say, the Google platform and applications. Then it is not only the individual student who can edit, but whoever he or she chooses to allow the documents to be shared with, and they can co-edit the whole piece of writing. This is something very powerful and it is not complex. So the focus must be on what exactly do you want students to learn in terms of writing. Then you can apply the technology. But if you start with "there's Google Apps and let's try it", you will not learn very much from the process because you actually don't know what problems you are trying to solve.

When introducing any new technology, you have to be mindful of teachers' comfort levels and get them started at a level where they see use, meaning and relevance. Teachers must feel that the technologies are going to help them to do things that they cannot do, or help them do things faster, or reach out to the students.

When there is inadequacy in terms of factors like infrastructure, bandwidth, digital content and technology support, technology can become a hindrance. It is the hygiene factor: if you are going to use Internet in your lessons and it is very slow, it will discourage your teachers from using it. Teachers are busy people, if they don't have good digital content, they are not going to use it as well.

Janet Chiew: One pitfall commonly seen in overzealous education technocrats is to expect technology to replace existing teaching practices completely. It should be recognised that innovation in education technology can succeed only as far as innovation in technology integration into the curriculum can be achieved. When Philadelphia's School of the Future first opened in US, the school expected its online learning management system to completely replace existing teaching resources like physical textbooks and print materials, without undertaking sufficient planning to redesign classroom teaching practices in order to draw out the value of technology. Teachers there who were unable to catch up with the pace of technology change were essentially crippled by technology. As with all technology implementation, and more so in education, proper workflow, lesson integration and change management are musts.

Another pitfall is adding new applications and servers without adequate network and infrastructure planning. The basic foundation of education technology is robust infrastructure. Education services, such as online learning systems, content portals, wikis, 3D virtual worlds and electronic portfolio systems with heavy multimedia content are resource intensive. The lack of optimisation in network resources hampers the performance of applications and translates to poor experience for the teachers and students. For this reason, the education sector is now investing more in network management and optimisation solutions, and IDC foresees that more schools will be looking to software-as-a-service subscriptions to reduce the overall maintenance efforts required.

A third issue to watch is technical support. Sufficient technical support may seem trivial to some, but is especially critical in the K-12 (kindergarten, primary and secondary school) segment. Technology vendors and schools must recognise that a group of six to 18 year-olds will not be able to understand and communicate technical difficulties as effectively as adults. Resolving simple technical issues for young users will take much more time than most expected, and more often than not, students will choose to approach teachers instead of calling helpdesk for support. Schools and technology service providers need to invest sufficient resources by providing adequate dedicated face-to-face front line technical support for students.

Boon Kiat: Yen Yen, with your perspective as a technology vendor, what do you see as the positives and negatives when it comes to implementing technology in schools?

Panelists

Koh Thiam Seng, associate professor and principal of St. Joseph's Institution
Eugenia Lim, principal of Crescent Girls' School
Janet Chiew, research manager, IDC Government Insights Asia Pacific
Tan Yen Yen, vice-president and managing director of Hewlett-Packard (HP) Singapore
Moderator: Ong Boon Kiat, BizIT editor, The Business Times



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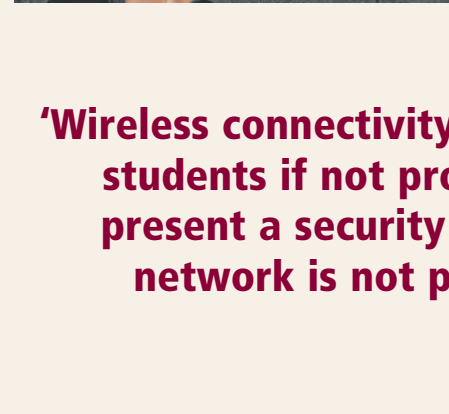
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– Tan Yen Yen

Tan Yen Yen: Technology has made our lives much easier. Today we can respond to an email query much faster and not have to rely on "snail mail" to arrive. Similarly, in a learning environment, we have seen technologies such as the Internet, computers and calculators speed up the proliferation of education options and methodologies. These tools provide access to global information in no time, which students find relevant to improve their knowledge and carry out research etc. In addition, technology has contributed to innovative learning experiences through Web-based teaching methods such as Web seminars and e-courses.

There could be three key scenarios as to why technology may be perceived as a hindrance to learning. The lack of availability of comprehensive and accurate information from the Web and other channels is one. Second is when there is over-dependency on technology. Third is when technology systems fail.

Boon Kiat: Please elaborate.

Yen Yen: For instance, some websites do not provide complete information on a subject unless it is paid for. And the accuracy of data is more often than not left unverified, which means the use of such information can be dangerous or misleading. This is where teaching and guiding students becomes more important than before. Teachers must make students understand the limitations and down-

sides of accepting any information as valuable and valid. They must develop the ability in students to engage the world in a critical and analytical manner. In other words, learning today is also about learning how to learn, and how to discriminate, disregard and swim through the flood of information that is accessible to them.

Tools such as calculators and electronic dictionaries can hinder the natural learning process by oversimplifying it. As such, students may end up losing out on the actual learning process and rely too much on these tools instead of their abilities.

When technology systems go down, productivity and efficiency levels go down correspondingly. Systems jamming up can cause significant delays, as well as affect time-sensitive operations such as class registration, online release of grades and so on.

Boon Kiat: Eugenia, Crescent Girls' School has embraced technology and it is one of the schools selected by the government to develop new high-tech learning and teaching processes under the FutureSchools@Singapore initiative. What lessons have you learned in your technology trek?

Eugenia Lim: First, that staff readiness and competency are the most crucial factors to our success. To that end, we have put in place a very comprehensive professional development plan on ICT to ensure all staff are

equipped with the necessary skills and mindsets to embrace innovation and technology, as well as effectively infuse technology in teaching and learning. Second is the importance of ensuring that technology adds value to learning. Third is the importance of forging strategic and long-term partnerships with vendors.

Boon Kiat: And how has the return on investment and learning results arising from the use of technology been at Crescent so far?

Eugenia: Crescent Girls' School has embarked on the mobile-learning programme, by using tablet PCs to integrate computer technology seamlessly across the curriculum. This is our sixth year of implementation and the programme has now spanned over four cohorts of students. The school conducts comprehensive surveys for students, teachers and parents on the mobile-learning experience. Results showed that students have been using tablet PCs very pervasively in various subjects. Results also showed that students find tablet PCs very useful in helping them to search for and organise information, collaborate and communicate with peers and teachers, as well as creating new knowledge through ICT.

Our staff have also indicated that the mobile learning programme has improved their competency in technology. They are able to better facilitate student learning and engage

students through the use of technology. The first batch of mobile-learning students graduated in 2007. This and subsequent batches of students produced excellent 'O' Level examination results.

Boon Kiat: How should technologies be assessed?

Yen Yen: Technologies should be evaluated on the value they can bring to the classroom. For instance, wireless connectivity can pose a distraction to students if not properly regulated, and also present a security risk if information on the network is not properly protected against intruders. Secure networks that offer password protection and different tiers of access can ensure that students, staff and visitors have the appropriate levels of access to information without compromising the integrity of the network.

Technologies should also be evaluated based on how they address the key technology trends in education, such as ubiquitous computing, 24x7 connectivity, Web 2.0 and Web self-service applications, distributed education, decentralised computing support and a paperless paradigm.

Janet: Technology assessment warrants top and working level participation, ranging from principals, heads of departments, to teachers. The reason is simple: any major investments in technologies should not stem from needs of a single subject or department, but should be versatile enough to be able to serve the needs of a larger school population. Greater school involvement in assessing technologies also promotes innovation generation for the use of the technology by other potential school users as well. Beyond technology features and benefits, teacher readiness and training are often overlooked during technology assessments and deployments. Professional development is a critical part of technology introduction, and sufficient training and support for teachers to incorporate the use of technology into classrooms must be well planned for.

Boon Kiat: How does one balance the positives and negatives of the Web and Web 2.0 tools?

Thiam Seng: Of course, the ill effects of social media and personal computing such as access to pornography or computer game addiction are there. But I maintain that it is a question of educating our kids well and helping them understand the correct things, and teaching them the right values. Let's face it, it is the reality today. Rather than fight, it is better to concentrate on inculcating the right values and to use these tools for their learning.

The use of social blogs, wikis and YouTube and such have actually brought in a new level of learning for kids. In the past, the only people who can access their work is probably the teacher. Today, with social media, everybody can create content and more importantly, they can share and critique each other's content. So you widen the means of assessment. It is not only teachers assessing students, but students assessing among themselves and teachers can look at what's happening. And I think there is a social dimension to the learning that becomes possible with social media that we need to harness and leverage to improve learning.

Eugenia: There are measures that schools can take to mitigate such risks. Crescent has a robust cyber-wellness programme in place to educate learners. In addition, we use "enclosed" social networking tools and have developed innovative solutions to support learning. These solutions offer safe yet exciting ways for students to collaborate and network.

Boon Kiat: How well does Singapore match up to other countries in terms of its use of technology in education?

Janet: Singapore is one of the leading countries in the region in terms of introducing new technologies into schools, facilitated by the nation's broadband infrastructure. The FutureSchools@Singapore programme launched by IDA (Infocomm Development Authority) and the MOE (Ministry of Education) looks into whole-school transformation by integrating technology into school curriculum. To design and customise new education tools that fit into Singapore's curriculum, extensive efforts have been put in by multiple parties for this initiative, including technology solution providers, curriculum experts and classroom practitioners.

In other parts of the world, the UK government is also investing strongly in education technology through its Building Schools of the Future (BSF) programme. The programme will rebuild or renew nearly every secondary school in England, where technology requirements that play a major role will be incorporated into school building designs and curriculum changes. Australia's Digital Education Revolution (DER) project provides secondary schools with computers, high speed broadband, online curriculum tools and resources across the country.

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