

Using tech well in learning is not about giving every student a laptop

Designing a good ecology for learning requires us to integrate new with old technology, think of the student, and provide skilled manpower to support teachers.

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Minister for Education Ong Ye Kung recently announced that all secondary school students will have personal learning devices by 2028 and schools will devote more time to teaching students about cyber wellness and digital literacy. Technology indeed increases opportunities for individualised learning and allows students to access resources outside of school. However, I would like to offer some considerations for thinking about how the investment in technology can be optimised for learning.

DON'T THROW OUT THE OLD

First, consider how to utilise old and new technology meaningfully and in relation to each other.

New and old technology co-exist in a network effect to support the learning needs of students. Too often, there is a tendency to think

that new technology supersedes old technology, but the greater need is to consider how each piece of technology contributes to specific learning aims, and how different forms of technology can serve different purposes.

Professor Estrid Sorensen, in his book, *The Materiality Of Learning*, demonstrates how pencils and paper, blackboards and chalk, textbooks and computers work together (or not) to support learning. She points to the need to examine how technological tools serve as important nodes that may support learning in one context, and yet detract from the desired learning aim in another situation.

One example of how new and old technology co-exist is the relationship between print and e-books. Despite predictions of the death of print from the 1990s, book sales remain brisk. The global book printing market is still growing annually because people do prefer print. At the same time, more people are reading e-books, whether for convenience or from

personal preference.

My own research on adolescent reading habits reveal that most students still prefer print but read more online as they get older. A multi-pronged approach to encourage students' wide and independent learning should thus focus on both print and e-books, to support adolescents' reading habits and extend reading possibilities. Some school libraries we have worked with are improving their print collection and are also collaborating with the National Library Board to help students access its e-book collection.

Another example of a relevant "old" technology is the whiteboard, the modern replacement for blackboard and chalk. While laptops may facilitate online conversation and research, the whiteboard provides a more flexible space for a group of people brainstorming in the same room. The immediate connection between board and hand allows for quick conceptualisation of ideas without the keyboard and screen, and facilitates collaboration.

The Singapore University of Technology and Design has whiteboards placed beside collaborative seating areas in selected sections of its outdoor learning space. These whiteboards serve as informal brainstorming and group-work spaces.

At Bedok South Secondary School, the teachers observed that the mere presence of a whiteboard in the library allowed students to group study, using the board to make a diagram of a mind-map to draw out chemistry concepts and discuss what they understood about the topic under discussion.

Whiteboards, as simple tools, have a lower bar for access in comparison to smartboards, which require expert assistance and are often under-utilised in schools.

THINK OF THE USER

Next, consider user needs in the

ecology of learning, and provide technology that can support independent and self-directed learning. Beyond the individual laptop, other technology can support student learning in school.

In my research on the role of school libraries supporting learning, I spend time in schools talking to students about their needs. Interestingly, one common technology that students ask for across different schools is the ubiquitous printer.

Some students tell me they do not have printers at home and many tell me that their home printers are unreliable ("it runs out of ink", "it breaks down", "my parents haven't had time to replace it"). They tell me they still need printers to print out notes because their printed typed notes allow them to revise and learn better. They print out materials for projects and create posters for advertising their co-curricular activities in school.

Although technology allows for massive information to be stored online, much of this information is lost in the cloud. The capacity to print their own resources can allow students easier access to certain kinds of information and greater independence in creating their own resources for learning.

Schools should also consider the kinds of software that can support students' independent learning. It is highly unlikely that most students can afford expensive hardware (high-speed, high-power computers, large monitors) as well as software (for example, Photoshop or Adobe Premiere Pro) for certain kinds of learning. Even open-sourced software may require a large bandwidth to run optimally.

Not all students have conducive home environments or Internet connection for these self-directed explorations. Placing these computers in an easily accessible

space such as the school library means that students who are interested in learning beyond the classroom can make use of these resources.

SKILLED PEOPLE STILL NEEDED

Finally, technology increases opportunities for learning but does not reduce the need for manpower to support learning. In fact, we need more skilled manpower in school to support the varied needs of different schools.

For example, Commonwealth Secondary School has a maker-space. It has hired a Maker Coach who has the expertise to help students use the equipment for "making" outside of class time. The Maker Coach collaborates with teachers and supports their project making. The Maker Coach also teaches and runs workshops for the school staff so that they, too, can be empowered to use the resources and help students learn.

Another example of an expert resource in school is that of the teacher-librarian, absent in most Singapore schools. The teacher-librarian collaborates with teachers to support the development of reading and information literacy curriculum, instructs students and ensures that the library's print, digital and online collections support teaching and learning. The teacher-librarian at St Joseph's Institution, Mrs Boey Wah Fong, collaborates with teachers to implement reading circles and designed a research programme to support students' project work at various levels. In the last few weeks, when mass gatherings were discouraged at school, she has been supporting students' learning by converting her research lessons into online lessons.

While our teachers are experts in their subject areas, we do need other experts in our schools to support their teaching and students' learning. Rather than

falling into the trap of thinking that technology can resolve all issues, we need to think about how technology can be harnessed to improve learning.

Instead of thinking about manpower allocation in terms of the teaching needs of the school, it may be more productive to consider the learning needs of the students to determine what additional expert manpower each school may require. From there, the Ministry of Education can determine how best to allocate funds for the specific personnel to support students' independent and self-directed learning.

As a beginning teacher in Raffles Girls' School in 2000, I was struck by how forward-looking the school was. We had a Cyber-Learning Centre, a room where we could do video-conferencing and make use of multiple screens for presentation (at a time when it was not the norm). I was willing to use this room because the presence of a permanent technical staff (his name was Hock Heng) to man this room ensured that I would not have to worry about technology. I had the opportunity to innovate in my teaching because someone was there to collaborate with me.

In order to create an environment that supports students' diverse learning needs and prepare them for future-ready learning, we need to think out of the box to consider how various elements – technology, curriculum, expertise – contribute to students learning for life. As we move towards a one-for-one laptop schooling system, we must remember that the complex task of learning takes more than one laptop.

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