POLICY IDEAS Nº 18

ICT in Classroom Learning: Exploring the Discrepancies Between Ideal Conditions and Current Malaysian Policy

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ICT usage in Malaysian schools remains exceedingly low, with the 2013 Auditor General (AG) report finding that less than 5 percent of Malaysian teachers make daily use of the ICT facilities provided.

Executive summary

In 2011, the Ministry of Education launched the 1BestariNet programme – an ambitious initiative to equip all government schools in Malaysia with high-speed internet connectivity, Chromebooks and, a *Virtual Learning Environment*. This programme was also an attempt to bridge the urban-rural digital divide in the country. The idea was to have ICT integrated as part of the teaching and learning processes in classrooms in order to enhance student outcomes.

However, a closer look at the workings of the 1BestariNet programme unveils the shortcomings of a one-size-fits-all approach to planning and implementation of this initiative. The main weaknesses identified in this paper are: lack of teacher training on how to integrate ICT into pedagogy, inadequate internet speeds and connectivity, and minimal involvement of school leadership when implementing ICT policies into their schools, all of which lead to minimal usage of ICT by teachers in classrooms.

In light of these weaknesses this paper recommends that schools need to tailor make their own ICT training programmes, to determine what bandwidth is possible for their condition and what kind of devices would be most beneficial for their student body. Additionally, the paper recommends the following to enhance ICT use in Malaysian schools:

• Enhance managerial autonomy for government schools to empower them to take control of the implementation process of ICT in education policies.

• Provide clear guidelines and support for school based ICT needs assessments.

• Provide an ICT implementation roadmap outlining how schools can tailor their own ICT implementation programmes, based on local needs.

• Facilitate ICT training for teachers at various levels, from the most basic IT skills to advanced training of ICT as a pedagogical tool.

*The contents of this paper represent the views of the author and do not necessarily reflect the views of IDEAS or any one individual at the organisation.

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1.0 Introduction

Over the last three decades there has been an explosive development of information and communication technologies (ICT) throughout society. As a result, increasing the use of ICT in education has become a priority in most education systems. To date, the Malaysian Ministry of Education (MOE) has invested over RM6 billion on ICT in education initiatives – such as the Smart School Roadmap and the Policy on ICT in Education 2010.[1] The most recent initiative, the 1BestariNet project launched in 2011, aimed to provide 4G WiFi connectivity to over 10,000 government schools nationwide, making Malaysia the first country in the world offering such provisions.[2] Nonetheless, ICT usage in Malaysian schools remains exceedingly low, with the 2013 Auditor General (AG) report finding that less than 5 percent of Malaysian teachers make daily use of the ICT facilities provided.[3]

It is not the intention of this paper to provide a full evaluation of the 1BestariNet project or the overall Malaysian ICT in education policy. However, this paper aims to provide an overview of the ideal use of ICT in classroom learning and how to implement an ICT in education policy most effectively. The second aim of this paper is to outline the current Malaysian ICT in education policies, focusing especially on the 1BestariNet project, and discuss the lack of implementation success in light of the ideal ICT conditions.

The argument in this paper is that in order to successfully implement ICT in classroom learning a holistic approach has to be taken. Three core issues have to be addressed: how and when to use ICT in classrooms, providing adequate teacher training in the use of ICT and how to use it as a pedagogical tool, and finally providing reliable internet with sufficiently high bandwidth for schools to use ICT without disruptions. Current Malaysian policies for ICT in education have seemingly taken these factors into consideration, by seeking to provide fast internet connection to all government schools, providing teacher training and Virtual Learning Platforms and devices. Nevertheless, due to an overtly centralised policy implementation, based on a 'one-size-fits-all' approach the usability of the system put in place is questionable.

2.0 ICT in Education – Background

The concept of ICT in classroom learning is about incorporating various forms of information technologies as pedagogical tools in everyday education.

The use of ICT in classroom teaching is not a fixed concept in itself. If seen as a scale, the lower end is teachers simply using information technologies, such as email or forums for student feedback and parental communication, or the usage of presentation tools – such as PowerPoint – to better facilitate the creation of student knowledge. On the other extreme of the scale there are the 1-on-1 schools, where each student is given – or loaned – a device, such as a laptop or a tablet for use during classrooms sessions, and in some cases at home. The devices are used as an integral part of classroom experience and the teacher's role becomes less of an instructor and more of a facilitator in the learning process. The students use their devices for research and information gathering activities and the teacher provides guidance and leads discussions around the subject.[3]

However, in between the two extremes, in schools and environments where 1-on-1 capacity is not possible, teachers can still use ICT interactively. There are several options, such as mobile computer labs with classroom sets of devices – laptops or tablets – that the teacher can book for interactive sessions and bring to the classroom when it is considered to be suitable. Other options include placing a handful of desktops or laptops in each classroom for group use, or – a much less interactive option – having a device connected to a projector in each classroom allowing the teacher to use videos or PowerPoint presentations as part of day-to-day teaching.

Integral to the use of ICT in classroom learning is the so called

1 Malaysian Ministry of Education. 2013. "Malaysia Education Blueprint 2013 – 2025" accessed from http://www.moe.gov.my/cms/upload_files/articlefile/2013/articlefile_file_003108.pdf

2 Ibid.

3 Ng, Eileen. 2014. "After millions spent, e-learning project struggles with under use, Auditor-General's report find" in Malaysian Insider accessed on 01-12-2014 from < http://www.themalaysianinsider.com/malaysia/article/after-millions-spent-e-learning-project-struggles-with-underuse-auditor-gen>.

4 Freedman, Terry. 2014. "Making the Most of ICT – What the Research Tells Us", in ICT in Education, accessed on 26-11-2014 from < http://www.ictineducation.org/home-page/2014/1/29/making-the-most-of-ict-what-the-research-tells-us.html>

virtual learning environments (VLEs). A VLE is an online education platform which is interactive and structured in order to facilitate learning. There is no exact definition of what a VLE is, but there is a growing common consensus that it has to be a platform especially designed for learning, which provides the possibility of interaction, through chat forums, as well as a repository for educational videos, documents etc. to be shared by teachers with their students and other teachers who use the platform.[1] As the VLE can be accessed from outside school, it is a tool that enhances flexibility and allows for communication between teachers and students even when they are not in close proximity, thus allowing for distance learning and other flexible learning methods.

2.1 Benefits of ICT in Classroom Learning

Teachers and educators alike argue that using ICT is a way to excite students about learning in what can be considered mundane methods, such as drill and practice exercises in mathematics and languages. It is a medium of information which students are increasingly used to and it allows students to feel that they are in control of their learning experience. When using interactive ICT platforms, there are opportunities for immediate feedback, which can, for example, be used to making drill and practice learning more engaging and effective.[2]

When using VLE platforms for classroom teaching there is also a greater possibility for flexibility. Students can be working on the same subject, but at different paces, allowing more advanced students to move on faster and deeper, whereas students who are struggling can be immediately identified and be given extra time for learning the basics.[3] This kind of flexibility allows the teachers to give individualised attention and study plans to each student. Finally, incorporating ICT skills into the learning of other subjects is the best way to train students for working life, where the use of ICT is integrated into many tasks. It provides excellent opportunity to enhance presentation and research skills, which is also in great demand in most service based workplaces.[4]

2.2 ICT Cannot Replace Teachers

The most important thing to remember when talking about using ICT in classroom learning is that the technology is a *tool* used by teachers to better facilitate learning and help students reach their full potential. That is to say, teachers should be able to use ICT to facilitate the building of their students' knowledge easier and more flexible. ICT is not meant to be, and can never effectively replace the role of the teacher. The central point is that ICT in classroom learning is not a magical tool which when employed by teachers will automatically enhance learning outcomes and the

> When using interactive ICT platforms, there are opportunities for immediate feedback, which can, for example, be used to making drill and practice learning more engaging and effective.

1 Dillenbourg, Pierre. 2000. "Virtual Learning Environments" *EUN Conference Paper* accessed on 28-11-2014 from < http://tecfa.unige.ch/tecfa/publicat/dil-papers-2/Dil.7.5.18.pdf>
2 Freedman. 2014.
3 Dillenbourg. 2000.
4 Freedman. 2014

growth of students. In fact, research has found that when the use of ICT in classroom learning is not well structured by the teacher there is little, if any, overall improvements in students' results.[1]

Research has found that for ICT to be a truly effective tool in classroom learning, several conditions have to be met. Firstly, it is best used as a part of a mixed learning environment, where different types of pedagogical tools are used, and the use of ICT is a supplement to traditional teaching methods, such as formal lecturing followed by group research or individual IT based drill and practice.

Other research indicates that ICT is most beneficial to student outcomes if it is used as a collaborative tool rather than on a 1-on-1 basis. This means that students actually benefit more from ICT in their studies if they do not have access to their own device; instead they have to share in pairs or groups. This means that teachers should be trained to plan for the use of ICT in a collaborative way, for example as group research with class presentations.[2]

2.3 The Effect of Teachers' ICT Literacy

Many of the above mentioned points on how to make the use of ICT in classrooms most effectively, however, are not intuitive. Neither can it be supposed that teachers

can implement such great changes into their teaching repertoire on their own. Therefore, in order for teachers to be able to both fully appreciate and, more importantly, to correctly and effectively incorporate ICT into their repertoire of teaching practices and pedagogy, training is needed. This training has to be a mix of technical knowhow, i.e. using the hardware (computers, projectors etc.) and using various software, then especially the VLE that is being used by the school, but more importantly the training has to focus on how to teachers can make best use of these tools to enhance the learning experience of their students.

In the short term, while the use of ICT remains low and mostly utilised through mixed method teaching, the training should focus on how to adapt traditional pedagogical practices, such as lecturing, drill and practice, and student centred research to fit in with a new ICT format. In the long-term, as the use of ICT is increased, the focus has to be on helping teachers grow in their role as facilitators and to build a new range of pedagogical practices more suitable for interactive teaching. Furthermore, teachers have to be instructed on how to incorporate ICT into student assessment and how to use it for giving effective feedback.[3]

Additionally, this training has to be on-going on-the-job-training.

That is to say, a one-off session is most likely not going to be enough. Instead there is a need for several sessions over an extended period of time, where teachers can get both instruction and practical knowledge. There has to be enough time between each session for the teachers to actually try out and incorporate what they have been training into their teaching as to find out where they are succeeding and where they require more assistance.[4]

Furthermore, research by European Schoolnet has shown that teachers, by and large, are much more likely to actually incorporate ICT into their classrooms if they feel secure in using technology, regardless of the current ICT policy in their workplace. Teachers who use IT extensively in their daily lives and consider themselves to be IT savvy are more likely to bring the use of technology into the classrooms and engage with their students on virtual platforms.[5]

It is likely that there will be a natural generational shift towards the incorporation of ICT in classrooms as younger teachers are used to extensively relying on ICT in their studies and daily lives and will see it as an indispensable tool in their teaching as well. However, in order to harness this tendency, teacher training colleges have to give solid training how ICT is best and most effectively used as a pedagogical

1 Livingstone, Sonia (2012) Critical reflections on the benefits of ICT in education. Oxford review of education, 38 (1). pp. 9-24.

2 Hattie, John. 2008. *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement.* London: Routledge.

3 Weeb, Mary and Margaret Cox. 2004. "A Review of Pedagogy Related to Information and Communications Technology" in *Technology, Pedagogy and Education* Vol. 13, No. 3 pp. 235-284. See also, Manny-Ikan, E., Tikochinski, T. B., & Bashan, Z. 2013. "Does use of ICT-based teaching encourage innovative interactions in the classroom? Presentation of the CLI-O: Class Learning Interactions – Observation Tool." In *Interdisciplinary Journal of E-Learning and Learning Objects*, 9, 219-232.

4 Freedman. 2014

5 European Schoolnet. 2013. "The 'Teacher Effect' on the Use of ICT in Classrooms", Briefing Papers Issue Nr. 1, accessed on 01-12-2014 from < http://www.eun.org/c/document_library/get_file?uuid=158e6686-f9f9-42c3-aa8d-f281c9ee43f0&groupId=43887>.

tool, as per the discussion above.[1]

Lastly, in order for teachers to be able to incorporate the use of ICT in their classroom teaching, there has to be sufficient technical support available. Anytime there are problems with connectivity or with devices, software, or projectors, a teacher has to be able to quickly access remedies from technical support staff, as to ensure that the lesson is not disturbed. If teachers do not have adequate technical support to back them up if things go wrong it is a further disincentive to use ICT in day-to-day classroom teaching, especially for teachers with low IT confidence.[2]

2.4 Connecting Classrooms – What Is Needed?

One of the core problems with integrating ICT into classroom learning is that it is very resource intensive and in many cases costly. To begin with, using ICT in schools, especially if it is using highly interactive VLEs tools, requires an adequate internet connection and a high level of reliability and maintenance of both internet connection and devices. Experiences from the UK indicate that in order for schools to be able to use ICT in classroom teaching, the internet has to be functional 99.9 percent of the time. Any level of insecurity in the system will lead to teachers refraining from using it.[3]

Furthermore, in order to have multiple users, especially performing interactive activities or heavy research tasks, internet speed has to be fast, or else teachers will not use it as too much time will be lost while waiting for programmes or tutorials to load. In fact, research in the UK has shown that the internet speed in a school is highly correlated to the use of ICT in classroom teaching.[4] Other research has shown that, in the UK, the ideal bandwidth for an average primary school is considered to be 13.4 Mbps and for an average secondary school, it is considered to be even higher at 55.0 Mbps.[5] Downloading speeds significantly slower than this will make it difficult for schools to run multiple devices using interactive software.

This kind of reliable and fast internet connection, however, is both expensive and requires a high level of infrastructural development. Internet connection in schools is best provided by using fibre-optic cables, as they provide the fastest and most reliable connections. This is not very problematic in urban areas, where there is a great demand from high speed internet, both from businesses and private consumers, and the fibre-optic networks have already been laid and are properly maintained. In rural areas, on the other hand, even in the most advanced industrialised nations, this infrastructure is often underdeveloped.[6] Therefore, providing rural schools with adequate internet connections often requires large infrastructural investments.

3.0 ICT in Malaysian Classrooms

The MOE has, since the 1990s, actively been promoting the use of ICT in Malaysian schools through various programmes and initiatives – such as the Smart School Roadmap and the Policy on ICT in Education 2010. In total the MOE has spent over RM6 billion on ICT related projects between 1999 and 2010.[7] Through the Education Blueprint 2013 - 2025 further advancements have been proposed in order to upgrade the ICT capacities in government schools. The main objective of this upgrade is to "ensure that students not only learn how to use ICT but are able to leverage it effectively to enhance their learning."[8]

Under the Education Blueprint 2013 – 2025, ICT in education will be tackled in three waves. The first wave, scheduled for 2013-2015, has been set to focus on ensuring that the foundations for ICT in schools are properly laid. This is to be done by focusing on three key areas:

- Ensuring students and teachers have sufficient access to ICT devices;

1 Ibid
2 Komza, Robert B. "Comparative Analysis of Policies for ICT in Education", in Handbook on Information Technology in Education. Accessed on 28-11-2014 from <http://digitalknowledgecentre.in/files/2012/02/Comparative-Analysis-of-Policies-for-ICT-in-Education.pdf>.
3 SEGfL. 2010. "Ten Questions Schools Should Ask Broadband Suppliers" accessed on 12-12-2014 from < http://www.segfl.org.uk/newsevents/news/ten_questions_schools_should_ask_broadband_suppliers/>
4 Wakefield, Jane. 2014. "Digital divide opening in UK schools report warns" BBC News accessed on 12-12-2014 from <http://www.bbc.com/news/technology-29424313>.
5 National Education Research Panel. 2009. "ICT Provision and Use in 2009/10" in Education Outlook Series accessed on 03/12/2014 from <http://www.nerp.org.uk/pdf/ICT2009_NERP.pdf>.
6 Wakefield. 2014.
7 Malaysian Ministry of Education. 2013. "Malaysia Education Blueprint 2013–2025"
8 Ibid.

Box 1: Model for succesful implementation of ICT in classroom learning

WHEN/HOW TO BEST USE ICT IN EDUCATION	
See ICT as a tool for teachers to use, not as an end in itself	Mixed methods, where traditional approaches to teaching are mixed with the usage of ICT, have proven to be most effective.
	Teachers should focus on 3 core aspects of ICT: • Helping students to enhance the capacity to present or represent ideas dynamically or in multiple forms. • Improving the possibility of providing students with feedback as they are working. • Giving students the chance of enhancing the capacity to present information in easily changed forms.
	Make the use of ICT a collaborative exercise where students use ICT in pairs or small groups.
Enhance ICT use by teachers	Providing effective teacher training, both on devices/platforms and on how to adopt/develop pedagogical approaches appropriate to the use of ICT in classrooms.
	Training should be continuous and enough time should be provided for trial periods between sessions.
	Assisting teachers to improve their IT literacy and confidence both at work and in their daily lives.
	Schools to be providing technical support to teachers so that lessons are not disturbed if there are problems with internet connections, devices or software.
Internet connection requirements	Sufficient downloading speeds are needed to avoid frustration and loss of valuable class time. • Secondary schools have a greater need for faster downloading speeds than do primary schools.
	The internet connection has to be reliable and stable, if internet is frequently down teachers will not be able to rely on it.

• Providing the education system with a learning platform and sufficient network bandwidth to use ICT services; and

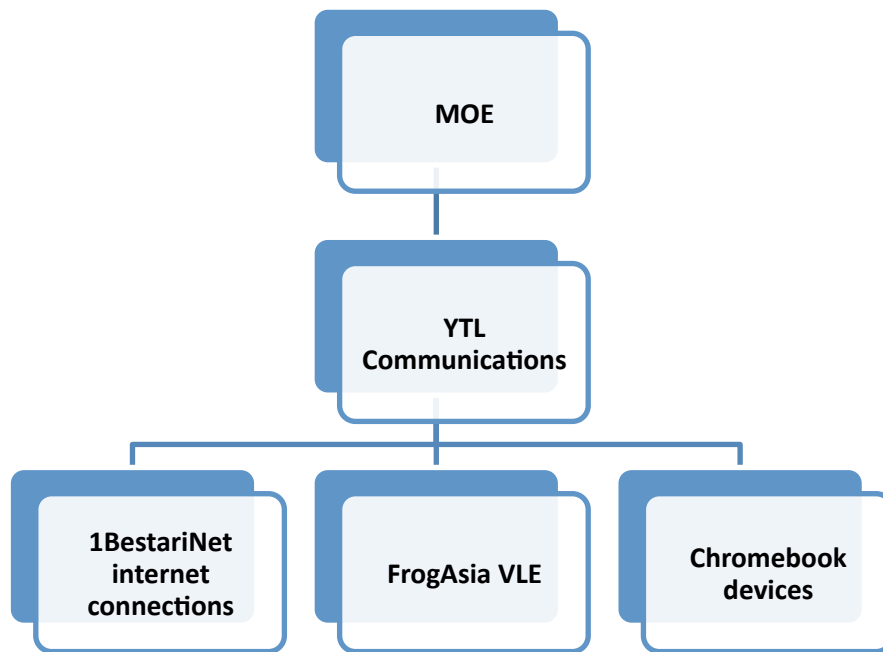• Ensuring that all teachers have basic competency in ICT.[1]

The second wave, 2016-2020, will focus on furthering innovations in the use of ICT in Malaysian education and setting best practice standards for how schools and teachers should seek to incorporate ICT in classrooms. Wave three,

2021-2025, will focus on ensuring that ICT is fully embedded into education practices and that innovative use of ICT in education is a continuous process.[2]

1 Malaysian Ministry of Education. 2013. "Malaysia Education Blueprint 2013–2025"
2 Ibid.

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Illustration 1: The chain of ICT in education provision

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                    ┌─────────────┐
                    │     MOE     │
                    └──────┬──────┘
                           │
                    ┌──────┴───────┐
                    │     YTL      │
                    │Communications│
                    └──────┬───────┘
         ┌─────────────────┼─────────────────┐
  ┌──────┴──────┐   ┌──────┴──────┐   ┌──────┴──────┐
  │ 1BestariNet │   │             │   │  Chromebook │
  │   internet  │   │ FrogAsia VLE│   │   devices   │
  │ connections │   │             │   │             │
  └─────────────┘   └─────────────┘   └─────────────┘
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One core aspect of the first wave is the 1BestariNet project, which was launched in December 2011, with the projected finishing date of December 2013. Under the 1BestariNet project, YTL Communications was commissioned to bring in wireless 4G internet to 9,889 government schools in the country, both urban and rural. Additionally, YTL Communications was commissioned to provide a VLE platform for the use of all teachers, students and parents in government schools. For this purpose they chose FrogAsia, an award winning VLE platform first developed in the UK.[1] Lastly, the contract with YTL Communications include a responsibility to provide devices to enable internet access in classrooms.[2]

The installation of the 4G WiFi internet has not been without complications. According to the 2013 Auditor-General's (AG) Report there have been delays in providing internet to 4,176 schools. Furthermore the AG's report found that in over 70 percent of schools audited, the WiFi connection does not cover the whole compound.[3] YTL Communications was fined RM2.4 million for the failure of implementing the 1BestariNet project according to the set deadlines.[4] Under the project, in the majority of cases, YTL Communications provides internet to schools via a so called 1BestariNet Receiver Integrated System (1BRIS)[5] – a tower like structure built on the school compound – which in turn is connected to WiFi providing internet across the compound.[6] The bandwidth provided to schools through the 1BRIS receivers is estimated to be between only 2 to 4 Mbps.[7] Furthermore, over

1 YTL Communications. 2011. "Next-Generation Integrated Learning Solution", accessed on 20-12-2014 from < http://www.ytlcomms.my/en/1BestariNet.aspx>

2 Zairil Khir Johari. 2013. "Is 1BestariNet simply a way for taxpayers to fund YTL's 4G infrastructure expansion across the country" accessed on 30-01-2015 from < https://dapmalaysia.org/english/2013/jul13/bul/bul5549.php>

3 Ng, Eileen. 2014. "After millions spent, e-learning project struggles with under use, Auditor-General's report find" in *Malaysian Insider* accessed on 01-12-2014 from < http://www.themalaysianinsider.com/malaysia/article/after-millions-spent-e-learning-project-struggles-with-underuse-auditor-gen>.

4 Panirchellvum, Vathani. 2014. "YTL fined RM2.4 million over 1BestariNet shortfall" in *The Sun Daily* accessed on 01-12-2014 from <http://www.thesundaily.my/news/1223369>.

5 It is worth noting here that the 1BRIS towers follow the safety standards set out by WHO and other relevant bodies, and is not considered to be endangering the health of students or staff (for further discussion see Norhisham Bin Hj Omar. ND. "1BestariNet Kementerian Pelajaran Malaysia" accessed on 19-01-2015 from < http://www.google.com.my/url?sa=t&rct=j&q=&esrc=s&source=web&cd=14&cad=rja&uact=8&ved=0CDMQFjADOAo&url=http%3A%2F%2Fwww.ictk-jpnns.net%2Fdownloads%2FTaklimat.pptx&ei=pc2_VObCGoql8QXDyoH4Dw&usg=AFQjCNGUWKXDRlrS-LwVEGRRPfgQ66IbzQ&bvm=bv.83829542,d.dGc>).

6 Norhisham Bin Hj Omar. ND.

7 Ng. 2014.

Box 2: Using ICT in Malaysian classrooms: One teacher's point of view

Our interviewee is a teacher in a semi-urban school in Pahang. This is a summary of her views of what it is like attempting to use ICT in classroom learning in Malaysia:

- The interviewee says that she has used ICT in her classroom on several occasions. She finds it is a good tool to motivate students to do group work and research based tasks. However, she says it is much easier to use with advanced and self-motivated students rather than those in less advanced classes.

- With regards to the internet provision in the school she says that the WiFi does not cover the whole compound and it is not very stable making it difficult to rely on. When the teacher wants to use it in class she feels she has to prepare a back-up lesson plan, just in case the internet is not fully functioning.

- There has been inadequate training given to teachers. Only one teacher from the school, the ICT teacher, has been sent for training. This was a one day training session on how to use the FrogAsia VLE. The ICT teacher has then been instructed to give tutorials to his colleagues. So far there has only been training given on how to use the VLE, no further training has been provided on how to effectively incorporate the use of ICT in classroom learning, either by the MOE, the PPD, or the school. This has led to a situation where most teachers in the school are feeling insecure about what they are supposed to do and therefore they are reluctant to use ICT in their classes.

- The schools has been given one classroom set of Chromebooks, however, due to the WiFi not covering the whole compound it cannot be used as a portable lab (as intended). Instead, an old computer lab has been converted into a stationary Chromelab where teachers have to bring their students. This is contrary to the whole point of having mobile labs as valuable class time has to be spent on relocating students to the lab.

- The internet connection is not fast enough to run all 40 Chromebooks at once, making some exercises very frustrating for the students. Furthermore, loading videos and 'heavy' webpages is slow due to the inadequate internet connection. It frequently takes several minutes to load a video, meaning that students lose their interest and the teacher feels insecure.

- FrogAsia is a cumbersome VLE to use. It does not load very easily, especially when the internet connection is slow. Additionally, it is difficult to navigate as there are too many widgets and features. This results in both teachers and students being reluctant to use it other than as a repository for exam papers and other exam related study materials.

- There is no smooth functioning app for FrogAsia, which makes the VLE very difficult to use on a smartphone or smaller tablet. As more and more people use smartphone to surf the internet rather than computers, teachers and students tends to forgo FrogAsia in favour of more easily accessible communication tools.

2000 schools in the rural schools have not been given the 1BRIS technology, or rather they are forced to access the internet via so called VSAT (i.e. satellite dish receivers) technology. In these cases, twenty schools will have to share a 2 Mbps connection.[1] This translates to a very slow connection for each individual school supplied with this connection.

In a response made by the MOE to the news portal *Malaysian Insider,* regarding the issues of low bandwidth, it was contended that, even though it is the objective that both teachers and students make regular use of the FrogAsia platform for teaching purposes, ICT cannot be used as the sole pedagogical tool. A mixed pedagogical approach has to be taken, where ICT and traditional methods are mixed.[2] Nonetheless, compared to the ideal internet speeds mentioned above, of 14Mbps and 55Mbps for primary and secondary schools respectively, it is highly questionable if even the higher speeds of 4Mbps promised under the 1BetsariNet project will be sufficient to allow for integrated use of ICT in Malaysian classrooms.

However, providing high-speed internet connections is only one out of the three focus areas under the first wave of the ICT provisions in the Education Blueprint 2013 – 2025. The MOE is also committed to delivering fit-for-purpose, cost-efficient devices to schools for students and teachers to use.

1 YTL Communications. 2012. "1Bestari-Net VSAT", accessed on 12-12-2014 from < http://www.btpnpp.com/download/BESTARI/1BestariNet%20VSAT%20Project%20-%20PMO.PDF>
2 Ng. 2014

Pertinent to this is to ensure that VLEs and other platforms can be easily accessible from different types of devices, such as smart phones and tables, so that teacher, students and parents can use already existing devices.[1] To date, this has been done primarily by providing schools with Chromebooks, as part of YTL Communications' commitment. The Chromebooks are not intended to provide Malaysian government schools with 1-on-1 capability, i.e. each student will not be given a Chromebook. The laptops will instead be placed in portable Chromelabs, where a classroom set of 40 laptops are placed on a transportable station for teachers to book and bring to their classrooms for the class to use during the specific period. This is a clever way to structure the use of ICT in Malaysian classrooms, as it gives the teachers the possibility of having 1-on-1 capability, but without having to purchase the large quantity of devices needed to supply each school with Chromebooks for each student. The Chromebook is aptly suited for this kind of multi-person usage, being a device that mainly utilises a 'cloud' platform instead of requiring the traditional programmes such as Microsoft office installed into the computer.[2]

Nevertheless, despite the recent initiatives by the MOE, the usage of ICT in classroom teaching in Malaysia remains very low. In the 2013 AG report it was found that daily usage of the VLE by teachers in Malaysian government schools ranged between 0.57 and 4.69

percent, with student and parent usage of the services being even lower.[3] There are of course a multitude of reasons as to why ICT is being underutilised by Malaysian educators and students, looking at the strictly anecdotal evidence provided in the case studies in this paper a few issues can be highlighted (for full accounts see textboxes 2 and 3).

First, the bandwidth, already considered low at 2 – 4 Mbps, rarely comes close to these levels. Often the actual downloading speeds experienced at the schools was as little as 1/10 of this speed. Second, the internet connection is not reliable, meaning that teachers do not feel secure in planning lessons relying on ICT as it means that they will need a back-up plan in

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Box 3: Upskilling teachers: the views of a teacher trainer

- This interviewee has been part of the team providing training on how to use certain features of FrogAsia. After having visited close to 100 schools around the country providing training sessions to teachers from the local area, this is their view of what the training process has been like.

- Training has only been given in one-off sessions. Though these sessions allow for some interaction and individual practice there has not been enough time to ensure that all the participating teachers have gained full understanding of how to navigate the FrogAsia VLE. This is especially worrying as the attending teachers are supposed to teach their colleagues how to use the platform.

- In most cases the training sessions have been attended by ICT teachers or teachers with a personal interest in ICT. However, on several occasions teachers with very low IT skills have been sent to the training.

- The internet connections in the schools where the training sessions has been held have been of varying speed. In a handful of schools the downloading speed has come close to the stipulated 2 – 4 Mbps, but in the vast majority of cases it has been around 0.5 – 1 Mbps. In a few cases the internet was down completely during the training session.

- The technology that is used by YTL communications is outdated. It would have been much better to integrate the policy of providing schools with internet connections with a rural fibre optics upgrade policy, as has been done in New Zealand.

- FrogAsia is unnecessarily expensive. There are much better VLE options around, such as Google education apps, which are free to use and more user friendly.

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1 Malaysian Ministry of Education. 2013. .
2 Google. 2013. "For Malaysia: Bringing Google Apps and Chromebooks to the classroom" accessed on 20-12-2014 from <http://google-blog.blogspot.com/2013/04/for-malaysia-bringing-google-apps-and.html>
3 Ng. 2014.

case the internet is down. Third, the training sessions provided to teachers have not been adequate, to date consisting almost exclusively of one-off day-long sessions to learn how to use the VLE platform and devices. Finally, the VLE provided to Malaysian schools is considered cumbersome and not user friendly, making teachers and students reluctant to use it.

In addition to the above discussed implementation problems, the 1BestariNet project has faced severe criticism based on the nature of the tendering process awarding the contract to YTL Communications. For example, it has been asserted that the 1BestariNet project has awarded YTL Communications with a monopoly on the provisions of ICT to schools. Furthermore, the towers erected on school compounds to provide the 4G internet will be used by YTL Communications to provide commercial internet access via its YES 4G broadband services in the neighbourhood. This means that the MOE, through the 1BestariNet project, is effectively subsidising the commercial ventures of YTL Communications, using taxpayers money.[1]

3.1 One Size Does Not Fit All

When looking at the implementation of the current ICT policy in Malaysia, the most striking aspect is the highly centralised, top-down approach taken. The implicit assumption in the implementation of the 1BestariNet project is that all schools, whether rural or urban, will have the same ICT needs and

the same starting point. This is exemplified by the AG's 2013 report, which states that there has not been a sufficient needs assessment carried out in order to adequately address the ICT needs of Malaysian schools before the 1BestariNet project was rolled out.[2]

A bottom-up approach, on the other hand, would recognise the need for schools to make individual needs assessments. Some schools, for example, might have a younger and more IT savvy teaching corps; an urban school might have had access to high speed internet for several years and have already started to use VLEs. More rural schools, on the other hand, might have both staff and students who are less exposed to ICT and with much less possibility of internet connectivity both in the school and in the community.

It cannot be assumed, therefore, that schools can follow the exact same path. Schools with less advanced usage of ICT, among staff, students and the community that they serve, will have to start off with a much more basic approach, need more teacher training hours and mentoring, and greater infrastructural investments. In short, such schools will need more time and effort and have more precarious road ahead compared to schools with high levels of ICT usage and existing broadband connectivity.

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1 Zairil Khir Johari. 2013.
2 Ng. 2014.

4.0 How New Zealand Did It

New Zealand understands the importance of not assuming a one-size-fits-all policy approach in their endeavour. This is precisely the approach which has been taken by New Zealand in their endeavour to facilitate schools with internet connectivity and promote ICT in classroom learning. The New Zealand model is highlighted in this paper as it exemplifies how a centralised ICT policy can be mixed with a decentralised mode of implementation.

It has been recognised that due to the major rural-urban divide that exists in New Zealand, all schools cannot be expected to be at the same level as each other in terms of infrastructure or ICT readiness. While the New Zealand Ministry of Education has taken a central role in assuring that all schools have access to reliable, high speed internet, they have not given directives or quotas to the schools on how to structure the use of their internet capacity.[1]

Even in providing the connection, the New Zealand Ministry of Education has not sought a solution where the aim is to connect all schools simultaneously. Instead, they are currently gradually expanding the fibre-optic network in the country, so that it covers rural areas and schools as well as urban ones. This process is expected to be completed by the end of 2016, thus truly bridging the urban-rural school divide in terms of internet

accessibility.[2]

Instead the New Zealand Ministry of Education has provided a roadmap for schools on how to successfully transform their schools to fulfil the goal of fully integrating ICT and e-learning practices into the education process of the schools. This framework is based on providing all school leaders with guidelines about how to assess the schools' ICT readiness, i.e. the existing ICT capabilities among the teacher body and the infrastructural capacities and how to tailor make an ICT upgrading programme based on the results of this needs assessment which will allow the school to make full use of ICT. The roadmap provides basic structures and milestones for schools to work towards, but the individual schools are free to decide at what pace the transformation is to be conducted and how thorough the process has to be. For example, schools that have had little previous experience with ICT and where the teaching staff has low levels of IT confidence the school can start by providing training on basic IT skills, such as web browsers and word processing, gradually building up the levels of complexity. On the other hand schools where teachers are already highly IT, literate training can directly be focused on how to address pedagogical issues surrounding the use of ICT in classroom learning.[3]

The benefit of this approach is that schools are in control of the ICT upgrading process. Instead of being forced to follow a pace set

If Malaysian schools had been given guidance on how to take stock of what IT competencies already existed among teachers, some school could have progressed both faster and at a lower cost towards fully integrating ICT into classroom learning.

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1 Wenmoth, Derek. (2014). "The View From Here: New Zealand" in ICT in Education. Accessed on 28-12-2014 from <http://www.ictineducation.org/home-page/2014/11/13/the-view-from-here-new-zealand-by-derek-wenmoth.html>. See also: "e-Learning Planning Framework" <http://elearning.tki.org.nz/Professional-learning/e-Learning-Planning-Framework>.
2 ibid.
3 Ibid.

Judging from the ICT policies set forth in the Malaysian Education Blueprint 2013 – 2025, and more specifically under the 1BestariNet project, it is clear that the Malaysian MOE has made attempts at implementing a holistic ICT policy.

by a central authority the individual schools can plan infrastructural investments and training according to their needs, thus reducing the risk of wasted resources and increasing the chance of success. This is an important point to make in relation to the Malaysian case. While the 1BestariNet project has undoubtedly led to improvements in the internet connections for some rural schools where fibre optic broadband network is yet to be expanded., many urban schools would have been better and more cheaply served had they been allowed to access already existing broadband infrastructure. Similarly, if Malaysian schools had been given guidance on how to take stock of what IT competencies already existed among teachers, some school could have progressed both faster and at a lower cost towards fully integrating ICT into classroom learning. Training resources could, then, have been focused on schools with lower levels of IT skills.

5.0 Concluding Remarks and Recommendations

The use of ICT is omnipresent in today's world, and naturally it has been making inroads into the education sector. In this paper it has been shown that the use of ICT in education is desirable, as it functions as a tool for teachers to motivate students and enhance the flexibility in education. If applied correctly, extensive use of ICT in education has the possibility to positively impact student outcomes, however, in order to ensure that a potential ICT reform is implemented well, three key areas

should be considered; how and when to apply ICT in classrooms, providing adequate teacher training in the use of ICT on how to use it as a pedagogical tool, and finally providing reliable internet with sufficiently high bandwidth for schools to use ICT without disruptions.

Judging from the ICT policies set forth in the Malaysian Education Blueprint 2013 – 2025, and more specifically under the 1BestariNet project, it is clear that the Malaysian MOE has considered these points and has made attempts at implementing a holistic ICT policy. This policy has focused on providing viable internet connections to all government schools, providing teacher training, as well as providing interactive VLE platforms for all teacher, students and parents.

Nonetheless, the usage of ICT in Malaysian schools remains extremely low. This is due to a series of implementation failures stemming from an overly centralised approach. The individual need and potential of schools have not been taken into consideration, resulting in a 'one-size-fits-all' policy which does not address the challenges most schools face in attempting to integrate ICT in classroom learning. Schools need to be able to, with guidance and support from the MOE, tailor make their own ICT training programmes, to determine what bandwidth is ideal/possible for their condition and what kind of devices would be most beneficial for their student body. Additionally, schools should be given the autonomy to choose the internet service provider which best serves their ICT needs.

In order to enhance ICT use in Malaysian schools this centralised policy implementation has to be reversed by:

- Enhancing managerial autonomy for government schools to empower them to take control of the implementation process of ICT in education policies.

- Providing clear guidelines and support for school based ICT needs assessments.

- Providing an ICT implementation roadmap outlining how schools can tailor their own ICT implementation programmes, based on local needs.

- Facilitating ICT training for teachers at various levels, from the most basic IT skills to advanced training of ICT as a pedagogical tool.

About the author

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