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**SUPPORTING TECHNOLOGY USE IN SCHOOLS WITH A PUBLIC-PRIVATE
PARTNERSHIP: A COLLECTIVE CASE STUDY OF FIVE ASIAN COUNTRIES**

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ABSTRACT

Developing and emerging countries are challenged to transform their educational system and schools in order to prepare their students for the 21st century. Although information and communication technology (ICT) has often been used as one of the key catalysts in the transformation process, many of these countries continue to face the problem of access to ICT. In recent years, many public-private partnerships between governments and the private sector have been formed to address these challenges. Based on the collective case study of five Asian countries in the Microsoft's Partners in Learning initiative, this paper discusses the best practices and associated problems, and formulates lessons learned and recommendations for the sustainability and scalability of a public-private sector partnership. The partnerships (at the local and national levels) highlighted in this paper are usually based on commonly agreed objectives and many have chosen to focus on building capacity of local stakeholders and end users. At the same time, the creation of partnerships with the local teacher education institutions is seen as a way to ensure sustainability and scalability of the initiative.

INTRODUCTION

The spectacular proliferation of information and communications technologies (ICT) has fuelled the creation of a global knowledge society. It has placed great demands on schools to enculturate their students to be lifelong learners; to learn how to seek out new information, think critically and show initiative to meet up with the challenges of the fast-changing world. Most countries, including many in Asia, have responded to these challenges in different forms and at varying levels; many of which include the formulation of policies and strategies to use ICT for teaching and learning in schools.

The primary motivation for using ICT in schools is that it supports students in their own constructive thinking, allowing them to transcend their cognitive limitations, and engages them in cognitive operations they may not have been capable of otherwise (Jonassen, Peck, & Wilson, 1999; Salomon, 1993). Although master plans, national policies and strategies of ICT in education exist in many countries, access to and use of ICT in classrooms within some countries and communities are still very low (Pelgrum, 2001). Such digital divides may widen the gap across communities in the areas of quality of life, competitiveness and economic development.

It is in this context of narrowing the digital gap that many governments, especially those in developing countries, have signed Memorandums of Understanding (MOUs) with private corporations that have the resources and the desire to undertake social responsibility (Inamdar, 2004; Mitra, 2003). The signing of an MOU is an important first step towards a public-private partnership. Such partnerships are often an integral part of ICT master plans in education. They

not only mobilize financial and resource support for the implementation of the master plans, but also allow schools to explore and experience emerging technologies and pedagogies (Lim, 2006).

Based on the collective case study of five selected Association of South East Asian Nations (ASEAN) countries, this paper discusses the best practices and associated problems, and formulates lessons learned and recommendations for the sustainability and scalability of a public-private sector partnership. The partnership is the MOUs that have been signed between the governments of Indonesia, Malaysia, Philippines, Thailand and Vietnam with Microsoft through the latter's Partners in Learning (PiL) initiative.

Under this initiative, Microsoft establishes partnerships with ministries of education, national and local government bodies, and other stakeholders to empower students and teachers to realize their full potential, mediated by ICT. The PiL initiative consists of three components or projects: the Learning Grants program, Fresh Start for donated computers, and School Agreement subscription licensing program. While the implementation of the PiL initiative in these countries is relatively recent (between late 2003 to mid 2005), it has made significant impacts on teaching and learning in schools. The impacts include the curriculum, professional development of school staff, school ICT culture, teacher use of ICT for teaching, and student use of ICT for learning. Although the approaches towards the implementation of the PiL initiative vary among these five countries, and their levels of ICT use in teaching and learning are different, there are many similarities in their experiences of implementation.

OVERVIEW OF THE PIL INITIATIVES IN THE FIVE ASEAN COUNTRIES

The two main programs of the PiL initiatives, Fresh Start and School Agreement, were consistent in form and implementation across all five countries. The third program, Learning Grants, however, was more varied as each country customized the program based on its needs and its schools' readiness for ICT in education. Under this program, there were teacher development, leadership development, online learning community portal, student helpdesk and special projects. This section attempts to give an overview of these programs and their sub-program in the five countries. A summary of it is shown in Table 1.

[Insert Table 1 here]

Fresh Start

The Fresh Start program has not been very successful and the take-up rate has been rather low. For example, under the program, there were only 446 donated computers in Malaysia, 7,180 in Indonesia, and only 150 in the Philippines. In Vietnam, this program did not start due to various political, social and economic reasons. However, in Thailand, the take up rate was very high thanks to 53,000 donated computers. There were two possible reasons for the low take up rate for most of these countries. One was that schools in these countries did receive donated computers but not on a large and organized scale like the Fresh Start program. Instead, they might have received the computers directly from local companies or from parents. Second, many of these donated computers already had the operating system installed; making the Fresh Start program unnecessary.

School Agreement

The take up rate for School Agreement was also low. Despite the low fees for the licensing of the software, not many ministries of education or local education departments have taken up this program. In Thailand, only 8,500 licenses were taken up. In Vietnam, only one private international school and in the Philippines, only three schools have signed the agreement. Perhaps, the PiL country manager might have to work more closely with the ministries of education and local education departments to allow individual schools to purchase these licenses under a broad country-wide or region-wide agreement. In addition, there should be extra incentives to encourage school administrators to switch to legal software. One incentive could be the bundling of teaching and learning resources with the Microsoft Office software.

Teacher Development

Under teacher development, all five countries have mounted training courses for teachers. A lot of time and resources have been put into this program by the countries and some direct effects were observed in the case study reports. The courses ranged from basic ICT skills to ICT integration strategies and peer-coaching. These courses were conducted in various cities of each country in order to reach and prepare as many teachers as possible for ICT use in teaching and learning. Master teachers were also trained at the regional level so that they could train other teachers in their own schools or districts.

Leadership Development

School leaders play one of the most important roles in initiating and supporting the use of ICT in the schools (Ertmer, 1999; Lim & Khine, 2006). The professional development of school leaders was a critical feature of the PiL initiative. Under the initiative, a set of leadership modules

(Leadership in the 21st Century and Leading Change) was designed and developed. In Thailand, 18 school leaders have attended workshops on leadership development; in Vietnam, almost 1000 school leaders have attended a seminar on 21st Century leadership skills; and in Indonesia, about 120 school leaders from Jakarta have attended a series of leadership development workshops and seminars co-organized by the Ministry of Education (Indonesia) and the PiL team in Indonesia. In Malaysia, the Ministry has evaluated the Leading Change module and is considering its implementation for all school leaders in the country.

Online Learning Community Portal

All five countries have put up an online learning community portal for the PiL initiative and the PiL country managers have publicized it during the training workshops for teachers and school leaders. The portal facilitated sharing among teachers and school leaders, and identified and highlighted good lesson plans and materials developed by the previous winners of the Innovative Teachers' award from each country. While the portals have already been set up, the managers were continually encouraging participation among the teachers and school leaders to engage in knowledge creation and sharing.

Student Helpdesk

The student helpdesk was a module to train students to troubleshoot technical computer problems in school. The module offered first level support for teachers and students in the school who might have encountered technical difficulties. Presently only two countries have conducted this training program for the students. In Malaysia, 25 secondary and two primary schools were involved and the students have demonstrated significant improvement in ICT competencies after

the workshop (as reflected in their post-test scores). In the Philippines, the student helpdesk was conducted for three schools; however this program was not a priority. The other three countries in this study have not placed any emphasis on this aspect of the PiL initiative.

Special Projects

Many countries have developed special projects that have been important in fulfilling the country's needs in using ICT for teaching and learning. These projects were important as they sustained the PiL initiative in the respective country. For example, in the Philippines, the PiL initiative developed the Masters program that would help school leaders to develop action research competencies and management of ICT use in their schools. The PiL special project in Thailand conducted ICT camps for youths to provide them with the opportunities to explore ICT in their learning. In Malaysia, the PiL initiative collaborated with the Ministry of Education to fulfill the country's SMART school program. The initiative assisted the Ministry in identifying experts to construct the country's ICT competency list for students and teachers.

RESEARCH DESIGN AND METHODS

The collective case study of the five countries was conducted from March to August 2006. The team of researchers established initial contact with each country's PiL manager and co-planned the study with him/her. The team spent between four to ten days in the field collecting the data, and some of the interview data was collected via e-mail and telecommunication. The data collection methods in each country included: interview with the PiL country manager, interview with a private sector partner, interview with a PiL advisory board member, interview with a Ministry of Education personnel, on-site observations of two to three schools, interviews with

principal and teachers, focus group interviews with students, on-site observations of ICT training centre or/and sessions, and interview with an ICT trainer.

Interview With The PiL Country Manager

The interviews with the PiL country managers were all approximately two hours each. The main objective of these interviews was to get an overview of the PiL initiative in the country and to plan for the data collection. Besides the two-hour interview, there were e-mail and telecommunication exchanges to gather more information and exchange interpretations of data as the case study progressed.

Interview With A Private Sector Partner

A 45-minute face-to-face interview was conducted with a private sector PiL partner in each country. The focus of the interview was on the type of partnership between the partner and Microsoft, and the roles played by each party in the initiative. The partner was also asked about its work with the schools, teachers and students.

Interview With A PiL Advisory Board Member

A 45-minute face-to-face interview was conducted with one key member of the PiL advisory board in each country. The member was asked to explain his/her interpretation of the mission of the initiative, his/her role in the initiative, his/her collaboration with the Ministry of Education, schools, teacher education institutes and teachers, and the challenges that he/she has encountered in the initiative.

Interview With Ministry Of Education Personnel

A 90-minute interview was conducted with a senior management personnel of the Ministry of Education in each country. The focus of the interview was on the partnerships between the ministry, Microsoft, regional/local government and the schools. He/She was asked to explain his/her role in facilitating the partnerships, his/her interpretation of the mission of the PiL initiative and its impacts on teaching and learning in schools. He/She was then asked to comment on the various policies and initiatives at the national and regional levels that have been supported by the PiL initiative and have supported the initiative, and the challenges facing the initiative.

On-site Observations Of Schools Involved In The PiL Initiative

The research team visited at least two schools per country. The researchers spent about three hours in each school to observe ICT-mediated lessons and tour the school facilities, especially ICT ones. Most of the observed lessons were conducted by the students and facilitated by the teachers.

Interviews With The Principals And Teachers

The principals and teachers were each interviewed in a one-hour session. They were asked to describe and explain the following:

- The ICT vision of the school;
- The initiatives that have been put in place;
- The partnership between the school and Microsoft and the roles of each party in the partnership;

- The impacts of the different projects of the PiL on teaching and learning in the school and schools around the region;
- The staff development program that has been designed and implemented for the PiL initiative; and
- The challenges faced by the school in the implementation of the PiL activities.

Focus Group Interviews With The Students

Two groups of six students were interviewed for 40 minutes in each country. They were asked about their experiences in using ICT in the learning environment and its impact on their learning process. They were also asked about the problems they faced when using ICT to learn and the challenges that the teachers and school faced with respect to ICT-use in teaching and learning.

On-site Observations Of ICT Training Centre/Sessions Under The PiL Initiative

The research team visited the national ICT training centre in Indonesia, the regional ICT training centres in Malaysia and Vietnam, and the ICT training sessions in the Philippines and Thailand. When there, they toured the facilities and observed ICT training classes for the ICT coordinators or teachers from different schools. The ICT training sessions lasted three days, of which the team sat-in for most of it.

Interview With An ICT Trainer Or ICT Training Coordinator

Most of the trainers or ICT training coordinators were interviewed for one hour on the history of the centre or training, and the collaboration efforts the centre or group of trainers have had with Microsoft, the Ministry of Education, local government and other schools in the country. They

were also asked to explain and elaborate upon the activities in the centre or session and how the centre or group of trainers validated its training.

PARTNERSHIP FEATURES OF THE PiL INITIATIVE IN THE FIVE COUNTRIES

Partnerships With National And Local Government

One of the most unique features of the PiL initiative in all five countries was the intensity and scope of dialogues between Microsoft and the national and local government. Microsoft has been working very closely with the national governments with respect to the ICT master plan in education, ICT curriculum for students, ICT hardware and software, and professional development of teachers and school leaders. It has been able to engage different departments within the different ministries to collaborate on various aspects of the PiL initiative. This is especially pertinent in some of the countries where most departments in the Ministry of Education have their own ways of administering ICT programs in education. Such dialogues ensure close contact and synchronization of the implementation of the PiL initiative with the ICT programs in the Ministry.

One common area of partnership across all five countries was the professional development of teachers in basic ICT competencies right through to advanced competencies. Teachers who have gone through the professional development courses were awarded with credit points that might then contribute to their staff appraisal and salary increment. These courses were coordinated by Microsoft and the national government, who set the curriculum, provided the trainers, facilities and meals, and awarded the certificates. The local governments identified the schools and funded the teachers' day-to-day training expenses such as accommodation, and transport. Most of the

basic and intermediate courses were conducted at the regional or district level, while the advanced courses, at the national level. The monitoring of the teachers' professional development was usually left to the local governments. The partial funding of the training and the monitoring of the teachers by the local governments ensured that the latter have a sense of ownership to the professional development program and certification.

Besides activities co-organised by the whole Ministry and Microsoft, there were other activities that were organized by specific departments in the Ministry with Microsoft. Some of these activities were described and explained by Mr. Budiana, the Head of Jakarta High School Administration, during the interview. One recent activity was the workshop on the 21st Century Schools organized for 120 headmasters of Jakarta schools. Mr. Budiana believed that the use of ICT in education should begin from the school leaders and that they should be acquainted with the issues of ICT integration and should create a conducive environment to support teachers in the use of ICT in their teaching and learning. Mr. Budiana highlighted the importance of the partnership between the national and local governments with Microsoft to ensure the effectiveness of these activities. He commented that Microsoft might serve as the resource agency by providing the Ministry with the necessary professional development curriculum, materials and resource persons.

PARTNERSHIPS WITH UNIVERSITIES OR TEACHER EDUCATION INSTITUTIONS

Microsoft (Indonesia) has created a strong and sustainable partnership with universities in Indonesia and the Directorate General for K-12 Education by forming Team CERDAS in

December 2005. A literal translation for CERDAS is smart. The main objective of the team was to create a blueprint for the professional development of teachers with respect to competencies related to using ICT for teaching and learning. That is, the focus of the curriculum for teachers was not only technical competencies but also pedagogical ones. The plan for the research team was to create three levels of curriculum that would cater to the different needs and competency levels of the teachers. These three levels of curriculum would also serve as standards that the teachers need to keep up to in order to operate effectively in the school system.

Such a professional development curriculum would better support existing national ICT curriculum for students. It is only when ICT becomes a way of life for teachers that they are more likely to use ICT in their classrooms and hence, schools are more equipped and comfortable in implementing the national ICT curriculum for students. The draft of the blueprint has been sent to some teachers, ICT coordinators, researchers and teacher educators in Indonesia to get their feedback. And the general feedback so far has been good except that the basic level was still too difficult for the majority of the teachers. The research team has gone back to its drawing board again. The research team consists of 14 teacher educators from the public universities including Universitas Negeri Jakarta, Universitas Negeri Yogyakarta, Universitas Negeri Malang, and ST Teknik Surabaya.

Microsoft also trained teacher educators from teacher education institutes in Vietnam. A number of teacher educators were sent to Bangkok for training to be master teachers and when they returned to their institutions, they were expected to apply what they have learnt and peer-coach the rest of the teacher educators. Training materials developed under PiL were also used as

resource materials for the training of beginning teachers in various teacher education institutes. Partnership is indeed the backbone strategy of many programs under the PiL initiative of Microsoft (Philippines). In its No Teacher Left Behind project alone, PiL collaborated with 200 academic partners comprised of premiere colleges and universities nationwide, all of them with a strong educational thrust on ICT and computer science. Each of these colleges and universities, through a signed Letter of Commitment, pledged to train 100 public school teachers in the use of ICT in teaching and learning.

The PiL initiative also involved two premiere teacher education institutions, namely, Philippine Normal University and the Cebu Normal University. Apart from being PiL implementing partner institutions, the presidents of these two universities also sat as members of the PiL National Advisory Council. The two institutions, in cooperation with Learn.ph Foundation, intended to implement a Master of Arts Program in Instructional Design and Technology. Finalists to the Innovative Teachers Leadership Awards would automatically receive scholarship grants to pursue this Masters program.

Curriculum, Resources And Assessment

As discussed earlier under partnerships with the national and local government, Microsoft in Indonesia, Thailand and Philippines were involved in the development and implementation of the ICT curriculum for schools with the Ministry of Education. The curriculum was co-constructed with the diverse needs of the students in mind. Given the close working relationship with the ministries of education, the curriculum has a better ground feel as the ministries have the data of the schools and have also been holding dialogue sessions with teachers and school

leaders. As a one-size-fit-all curriculum was unsustainable, the national ICT curriculum was at times localized at the provincial level by Microsoft, together with the local government, to suit the needs of the schools in the province.

As the ICT curriculum was to be implemented in all state-owned schools, education resources to support the curriculum were of absolute importance. The education resources produced adopted a pedagogically sound approach by providing a context for the learning experience and necessary scaffolding to guide the students through the learning process. Most of the resources were translated from English ones, but more important, there was localization of the resources to make them more familiar to the students in each country. Such resources included teachers' guides, textbooks, CD-ROMs, and online learning portal to support teachers in delivering and facilitating the lessons, and students in developing their ICT competencies.

Besides curriculum and resources, Microsoft also worked closely with the ministries to develop assessment instruments to test whether students have met up to the basic ICT competency standards. On top of that, Microsoft also worked with the ministries to develop resources for other curricular subjects. These resources included ICT-mediated learning packages and teachers' plans of ICT-mediated lessons that could be accessed from the online learning portal.

In Malaysia, the PiL initiative provided support for the development of New ICT Literacy Programs for Schools. A consultant was engaged by Microsoft to facilitate the process and to develop the ICT standard. In addition, local companies were also engaged to help develop some specialized modules for schools. However, the curriculum was used by some localized schools

and not adopted at the national level. Vietnam has a standardized national curriculum for its school system and the PiL initiative has little to do with the development of any ICT curriculum. Instead, PiL programs in Vietnam concentrated on the professional development of teachers and have very little to do with student learning or school curriculum.

PiL in the Philippines developed a Fusion curriculum which was a prelude to the Master of Arts in Instructional Design and Technology (MA IDT) program. The Fusion curriculum consisted of two strands. The first strand or the Fusion I curriculum focused on mapping out of ICT and relevant strategies required. Mr. Jacoba, the PiL country manager of the Philippines, reported that teachers who have participated in the Fusion I courses were able to successfully integrate ICT in their subject areas. Through the tech-mentoring component of the Fusion curriculum, the participants were also able to reach out to other teachers after the training by providing basic ICT literacy and ICT integration training activities. The interviewees related that soon after attending the Fusion training, they also conducted school-based writing workshops with the general theme “Aligning Basic Education Curriculum Competencies with ICT Competencies”; its design being an adaptation of the original Fusion curriculum. In the second phase of the Fusion training program, the concepts of multiple intelligences were infused into the design of ICT-enabled curriculum.

IMPACTS OF THE PiL INITIATIVE IN THE FIVE COUNTRIES

As ICT enters the sociocultural setting of schools, it “weaves itself into learning in many more ways than its original promoters could possibly have anticipated” (Papert 1993, 53). It may trigger changes in the activities, curriculum and interpersonal relationships in the learning

environment, and is reciprocally affected by the very changes it causes (Salomon 1993). Therefore, the discussion of the impacts of the PiL initiative in the five countries cannot be fractured from the learning environment in which it is situated; they will be discuss at three levels: education system, school and classroom.

Education System Level – ICT Curriculum

Due to the strong and sustainable relationship that Microsoft has developed with the ministries of education through various partnerships in the PiL initiative, it was consulted with, and eventually roped into, the development of the national ICT curriculum for K-12 schools in Indonesia, Philippines and Thailand. Such a development was to bridge the digital divide and to prepare its next generation of workers for the digital age. In Indonesia, Microsoft has taken a larger role in the development (as an expert and resource centre) due to the ministry's decision to use Microsoft products such as Microsoft Office and Microsoft Visual Basic. The curriculum would then be adopted by most state-run schools in the country.

The PiL initiative in Thailand has developed the training curriculum with the cooperation of the ICT experts at the MOE, the Microsoft certified training company, and the academic steering board that consisted of faculty from the University to review and advise the curriculum. There were three levels of training programs with 13 sets of curriculum: beginner, intermediate and advanced user levels. Since the training curriculum was developed in February 2004, there were several internal assessments and revisions of training curriculum from the team of trainers. The latest revision of training materials was completed in March 2006 and they are being used presently. However, the impact of PiL in the school curriculum was not felt in Vietnam as they

have a centralized school curriculum and schools have to follow the national curriculum. Recently, there has been greater awareness of the importance of ICT and it was announced by the Ministry of Education that informatics would be introduced into the schools' academic curriculum.

Education System – Professional Development Of School Staff

One of the largest professional development partnerships that Microsoft (Indonesia) has was with the Directorate for Vocational High School (Dikmenjur). More than 100 ICT centers have already been set up all over Indonesia with the headquarters in Jakarta – the National ICT Centre. The course to prepare ICT coordinators to run each of these ICT centers took between five to 10 days. Each of these centers was expected to run its own professional courses for ICT coordinators, school leaders and teachers in its district or province. Some of the centers have trained as many as 500 school personnel so far. Mr. Bona, the CEO of the National ICT Centre, concluded in the interview that “such centers have so much potential as they are able to localize the training for the teachers in their district and more likely to be of relevance to their teachers; at the same time, there is this fan-effect created by the centers to spread the training”. Such professional development of teachers is crucial as many researchers such as Martin (2000, p. 8) highlighted the importance of the role of teachers in using ICT in teaching and learning:

“Without the input and acceptance of teachers, the developments of useful educational technology projects are hindered. Not only are teachers the gatekeepers of the classroom, they are the greatest source of information about curriculum design and educational content.”

It is important for school leaders to be role models in using ICT. School leaders can lead the way by improving their own ICT competencies through attending staff development courses with classroom teachers, using ICT in their daily administration and communication tasks, and allowing teachers time to experiment with new teaching methods using ICT (Mize & Gibbons, 2000). Microsoft recognized such a role for schools leaders and co-organized workshops for school leaders nationally and regionally. At the regional level, a series of workshops on leadership training was conducted in Bangkok and in Hong Kong by well renowned professors in educational change and management. School leaders, administrators and Ministry of Education officers from the five countries attended these workshops and many were keen to use the materials developed for their own workshops. One good example was the initiative in Malaysia that intended to adapt the materials for the training of their principals in ICT leadership and change management.

In Indonesia, Microsoft (Indonesia) co-organized a school leaders' workshop with the Jakarta local government education service for 120 headmasters from state high school in Jakarta. This workshop was funded by the local government, while Microsoft mainly provided the trainers. The headmasters were given an understanding of the school of the future, the leader of the future, and the role of ICT in education.

The responses from the headmasters on the program were good and most of them confessed that they were more equipped to deal with ICT issues in their schools. Mr. Budiana, the Head of Jakarta Schools, commented that "before the workshop, many of

the principals have not even touched a computer and it was indeed an experience for them to be acquainted with not only computers but also the issues about using computers in schools”. However, he warned that the workshop was not a “one-time professional development activity”. He felt that there should be follow-up actions. Similar workshops were also conducted in Thailand, Vietnam and in Philippines. In Vietnam, for example, principals attended a workshop and seminar on “Building the 21st Century schools” conducted by a local professor. The principals have a good insight of what is expected of them but they would need further training and exposure in the future.

School ICT Culture

The school ICT culture provides the necessary and sufficient conditions for effective use of ICT in the classrooms. Based on the schools visited in the study and the interviews with various stakeholders, it was obvious that the PiL program has had positive impacts on the ICT culture in the schools – from collegial exchanges of knowledge and experiences to encouragement given to experimentation and the innovative use of ICT. This was observed in all the five different countries. In Vietnam, the teachers and students of Giang Vo Secondary School were more aware of the use of ICT in their teaching and learning processes because one of the master teachers in the PiL initiative introduced ICT-based project work in the school. Following that, other teachers were also keen to learn the approach.

Similarly, in Thailand, more ICT resources were put into schools which were used as training centers for teachers. As a result, it created a positive learning environment for the whole school. In Indonesia, although the involvement of SMA Negeri 29 and 67 was through their teachers

who had undergone the Peer Coaching workshops, the schools have undergone substantial transformation in their practices over the last two years. In SMA Negeri 29, more than 60% of the teachers have brought into the use of ICT in the classrooms and have volunteered for the ICT workshops conducted in the school. Such buy-ins by the teachers has prompted the school leaders to consider investing their limited financial resources on laptops and data projectors to support the teachers in the classrooms. The bottom-up approach in the implementation of ICT use in the school builds a conducive culture to sustain ICT integration efforts in the school. Mr Muso, a Biology teacher from SMA Negeri 29 who had undergone a series of peer coaching workshops, said during the interview that “after more teachers started using computers, there were more sharing among them in terms of teaching resources, and also in terms of sharing ideas and problems...it is a positive thing as it creates good vibes among teachers”.

Teacher Use

In his book on the ‘Diffusion of Innovations’, Rogers (1983, p. 24) warns: “It matters little whether or not an innovation has a great degree of advantage over the idea it is replacing. What does matter is whether the individual perceives the relative advantage of the innovation”. The conducive ICT culture in the schools in the collective case study has brought about a mindset change for the teachers in these schools. It was reported by the principals of some of the schools that there has been a more than 10 times increase in the use of ICT in the classrooms by their teachers. Moreover, the use of ICT has also become more innovative and student-centered. The principal of SMA Negeri 29 observed that “many of the teachers here actually encouraged active learning and peer teaching by the students using the computers. Computers are no longer seen as being for the teachers but now, also for the students”.

The teachers who were interviewed stated that their ICT proficiency and confidence have increased after attending the training conducted by their colleagues, and that has encouraged them to “explore the use of computers for our subjects”. One of them from Indonesia shared his experience of his journey of using ICT for teaching:

“It’s quite difficult to start learning because you don’t know where to start. But with Ms. Rahayu starting us off, we were more reassured and slowly, we learnt more and more about what computers can do for us. After four workshops, I started to experiment computers in my class and my confidence grew and I started to plan more lessons using computers.”

Most of the teachers in the five countries said that they started using ICT in the classrooms as a presentation tool to support direct instruction. But as competencies and confidence grew, they started to give more control to the students by getting them to do research on the world-wide web, carry out investigations using online simulations and present their findings on ICT platforms. The teachers interviewed all agreed that such activities enhanced engagement among students and promote self-regulation and higher order thinking. One example was the introduction of project work to students. Many schools from the different countries have introduced project-based learning after the teachers had attended training PiL workshops. The feedback from the teachers and students on this approach had been positive.

An example was in Malaysia where a teacher used this approach for a hands-on project on “Growing Vegetables”. The school was located in the city and most students were from the

urban areas and never had a chance to grow vegetables. In the other countries, many examples of project-based learning activities had been conducted and all the teachers interviewed mentioned that they acquired the skills and knowledge through the PiL training.

Student Use

With the enhanced ICT competencies and confidence, and the increased use of ICT in the classrooms and schools by teachers, there has been a positive impact on the student use of ICT. This was further enhanced by the National ICT Competency Curriculum adopted by most state-run schools. In the focus group interviews, the students reported a significant improvement of their ICT proficiency over the last two years. Most of them attributed the improvement to the greater opportunities of ICT use in the schools. The students in SMA Negeri 67 said that there were more ICT courses in the last two years but more importantly, more teachers were conducting lessons that required them to use ICT and submit their assignments using ICT. One student stated that “some of our homework, the teachers want us to submit by e-mail and some teachers want us to do homework that need the Internet because textbook is not enough”.

In the focus group interview with the students of SMA Negeri 29, they stated many of the same points raised by the students in SMA Negeri 67, and also highlighted the issues of collaborative learning and team work. One student said that “we now need to learn from one another and everybody depends on everybody in the class to learn”. The opportunities created by ICT for collaborative and active learning were taken up in both schools where students were expected to work on term projects in groups and then, present these projects to their classmates.

Besides the use of ICT by students within the curriculum, the schools in the case study have also created opportunities for students to use ICT in the after-school context. The Tsunami web project and the video editing project in SMA Negeri 67 were good examples of students' use of ICT. Most of the ICT competencies being developed in these two projects were picked up "just-in-time" with the guidance of the teachers in the ICT team and "learning on the go" with the students exploring the features of the software applications through trial and error. The increasing use of ICT by the students has also changed the culture of the school where teachers were no longer viewed as the sole source of knowledge and expertise. Ms. Rahayu, a Chemistry teacher from SMA Negeri 67 who had undergone a series of peer coaching workshops, commented on the change of roles of teachers and how that has a positive effect on the learning environment in her school:

"Students are sometimes better than us because they spend a lot of time on the software and we (teachers) must be humble enough to learn from them and draw upon their expertise. We must remember that we are not always the guru (experts), sometimes, the students are the guru."

This was further reinforced by Mr. Muso that "students are up-to-date with many things, especially computers; sometimes, we must let them teach us". It was obvious from the interviews that with the enhanced ICT competencies among students and their increased use of ICT, a change in the roles of teachers and students is necessary to create a more conducive learning environment.

LESSONS LEARNT

Based on the analyses of the experiences, best practices and associated problems of the PiL initiative and its associated projects in the five countries, the following lessons learnt were generated:

1. *The PiL country manager and his/her team serve as a mediator between the different departments in the ministry of education, government agencies, teacher education institutions, non-profit organizations, and private companies by initiating active and ongoing dialogues among these stakeholders of education.* Prior to the launch of the PiL initiative, there was little dialogue and collaboration of ICT in education between different ministries, agencies, organizations, teacher training institutes and companies. Such dialogues were even lacking within the ministry of education or department of education where each department tackled issues of ICT in education independently of the other departments. All of the PiL country managers have done a good job not only in engaging these stakeholders in dialogues with them but also in mediating the dialogues between them. In Thailand, for example, the PiL country manager has promoted dialogues both within the Ministry of Education and between the ministry and other organizations and companies. These dialogues have resulted in professional development workshops, such as the one co-organized by the ministry, Intel (Teach-to-the-Future) and Microsoft for 600 master teachers to develop their peer-coaching, ICT and pedagogical competencies. Besides professional development, such dialogues have also resulted in Microsoft supporting ICT projects such as the Her Royal Highness Princess Maha Chakri Sirindhorn ‘ICT for education in rural areas’ project under the Fresh Start Program.
2. *The PiL initiative has been able to establish sustainable partnerships with the ministry of education, government agencies, teacher education institutions, non-profit organizations*

and private companies. The PiL initiatives in all five countries were launched by a high government official within the country (for example, the Minister of Education or the Prime Minister). By doing so, it sent out a clear message to schools and other organizations regarding the importance of the initiative. For example, a PiL memorandum of understanding (MOU) was signed between Vietnam’s Ministry of Education and Training (MoET), and Microsoft when the Vietnamese Prime Minister, Phan Van Khai, visited the US in 2005. Although the high profile of the PiL initiative was crucial in getting the buy-in from the stakeholders, the more important issue was to sustain such buy-ins. The PiL country managers built relationships with the stakeholders, co-strategized with them the projects under the initiative, and empowered and scaffolded them in taking ownership of the projects. While the intellectual property rights of the initiative remained with Microsoft, the local organizations provided inputs on how the projects were to be implemented. This localization meant that the local organizations co-owned the projects and helped to sustain the initiative. One good example of such sustainable partnerships was No Teacher Left Behind project (<http://www.pil.ph/programs.asp>) – a partnership between the Department of Education, Microsoft and more than 200 universities and colleges in the Philippines to ensure that public secondary school teachers and their students were not left behind in the digital age. The project was designed based on a “pay-it-forward” model where Microsoft first trained the teacher educators in the universities and colleges who would then train the teachers nationwide on basic ICT literacy, desktop productivity, and software development.

3. *The ICT standards and curriculum for schools are designed and developed by a team of experts from the ministry of education, government agencies, teacher education institutions, schools and PiL country team.* Activities in schools are often driven by standards and curriculum. With a set of ICT standards and curriculum, schools will be better positioned to organize classroom and professional development activities to develop ICT competencies among students and teachers. In Indonesia, the development and implementation of the ICT curriculum for schools have been relatively successful, with most of the state-owned schools adopting the curriculum for their students. This set of ICT curriculum and standards for students was developed by a working group that was made up of representatives from Microsoft, different departments in the Ministry of National Education, universities and private sector. At least 35 million students across Indonesia will be undergoing such a curriculum from Year 7 onwards. However, in Vietnam, such national level ICT curriculum development under the PiL initiative was not possible as the national curriculum is centrally controlled.
4. *The selection of the right teachers for the regional peer-coaching workshops and the support that they receive after the workshops are pivotal for the effectiveness of the program to enhance the professional development of teachers in schools.* The selection of the teachers for the peer-coaching workshops was not only based only on the teachers' experiences and expertise in innovative teaching but also on their potential as change agents within their schools, districts and countries. These teachers have to analyze the needs of the other teachers and get them to buy into the use of ICT for teaching and learning, obtain the support of the school leaders, design and implement a sustainable professional development program for the other teachers, model and scaffold teaching

with ICT in the classrooms, organize teams of experts and master teachers to work together with them, reflect and evaluate on the effectiveness of their programs, and constantly revise and refine their programs. In the Philippines, the teachers who have undergone the peer-coaching program were expected to be tech-mentors who would not only secure the buy-in from the teachers and school leaders to ICT integration, but also to champion the use of ICT in teaching and learning in innovative ways. In the process, they guide and support fellow teachers from their schools and other schools to use ICT effectively in the classrooms. Such tech-mentoring was critical to the sustainability of the PiL initiative.

5. *The professional development of school leaders in education innovations and ICT use provides them with the competencies to effectively support teachers in the use of ICT for teaching and learning.* The professional development of teachers is a necessary condition for the effective use of ICT for teaching and learning in schools, while the pedagogical, technical and administrative supports provide the sufficient conditions for teachers. These supports are usually orchestrated by the school leaders in the form of school culture, policies, budget and manpower allocation, and time-tabling, curriculum and assessment matters. The professional development of the school leaders within the PiL initiative ensured that these leaders were making informed decisions to support their teachers in the use of ICT in teaching and learning. Workshops were held at the regional and national levels. The regional workshops included the 21st Century School Leadership workshop and the Leading a Culture of Change. At the national level, Thailand, the Philippines and Indonesia have organized workshops for their school leaders at the national level. In Malaysia, such workshops have been planned for early 2007 where the Leading Change

curriculum of the PiL initiative will be localized and delivered through the Institut Aminuddin Baki of the Ministry of Education to a pioneer batch of 500 school leaders. In Vietnam, nearly 1000 school leaders have attended the 21st Century School leadership seminars.

6. *The advisory board members of each country provide the technical and pedagogical support for the PiL country manager and his/her team, and offer the connections to government departments and agencies, universities and schools.* Most of the PiL country managers do not have any education technology background and hence, the roles of the advisory board members in providing technical and pedagogical support for the PiL initiative are crucial. The board members are from different organizations and companies: ministry of education, government agencies, teacher education institutions, non-profit organizations and private companies. Together, these members help the PiL country manager to establish partnerships with different stakeholders in the country. In Vietnam, for example, one of the senior members of the Advisory Committee took over the leadership training workshops because of his position as a famous university professor in ICT and he was able to command respect of the school leaders. Another advisor from the ministry helped in strategizing the training programs with the PiL country manager by identifying the schools, getting the schools to support the training by sending about ten teachers, getting principals to support the program, and identifying master trainers for training.
7. *PiL country managers are open and flexible and are able to customize their projects under Learning Grant to cater to the education needs of the country.* While most countries conducted teacher development under Learning Grant, there were some

specialized projects which were specific to each country. For example, in Thailand, special IT camps for youths were organized. In Malaysia, the PiL country manager helped to identify and source for ICT specialists from the ISTE (International Society for Technology in Education) to assist the Ministry to develop ICT competency skill standards for the schools. In Philippines, the PiL country manager collaborated with a learning foundation to help to develop a Master in Instructional Design and Technology program for leaders in the schools.

RECOMMENDATIONS AND CONCLUSION

Although the findings from the study of the five countries have suggested the positive impacts of the PiL initiative at various levels and generated the lessons learnt that can be taken up and applied in other similar programs or countries, there are various challenges that have been identified. Most of these challenges can be addressed with some revision and fine-tuning of the initiative and its activities. The following are the recommendations made:

1. *The key stakeholders of the country PiL initiative should have a good overview of the PiL framework and its activities to ensure a more holistic implementation of a program or activity.* During the interviews with the various key stakeholders (teacher educators, government officials, and ICT consultants) of the PiL initiative, many of them did not have an overview of what the PiL initiative was about and the various activities under it. Although they were well-informed about the projects that they were involved in, many of them were not aware of how their projects linked up to the other projects and activities in the PiL initiative. For example, during the interview with a group of teacher educators who were part of Team CERDAS, only one out of eight of them was aware of the

different projects under the PiL initiative and could see how the team's project was linked to other projects.

2. *The needs and situation analysis of the state of ICT use in schools (for example, teacher and student ICT competency, ICT facilities, and school budget) should be more rigorous to ensure the effectiveness and efficiency of the allocation of resources from the PiL initiative.* Although needs and situation analyses were carried out before most programs, there was a need for more rigour. For example, sending teachers from schools without computers for professional development in ICT use might be a misallocation of resources as they would not be able to apply what they have learned.
3. *The professional development of teachers should be tracked and monitored to ensure the continuity of their learning from one level of training to another, and to ensure the validity of the professional development (that is, whether the teachers have been applying what they have learnt).* Although the professional development workshops were well-organized, the teachers who were attending the various levels of training were not well-monitored and managed. In some cases, there was no follow-up of the teachers who have attended the basic ICT competency workshops; in other cases, teachers who attended the intermediate ICT competency workshops did not have the basic competency and hence, could not catch up with the rest of their classmates. Moreover, there was a lack of accountability for the teachers who have attended the professional development workshops; that is, they were not monitored to ensure that what they have learned during the workshops have been applied in their classrooms.
4. *The teachers who have undergone the peer-coaching program should be better supported by the PiL country team and their schools to ensure that they peer-coach other teachers*

and are role models for using ICT in teaching and learning. Most of the teachers in the peer-coaching program ended up organizing professional development workshops for other teachers over and above their existing workloads. There was no attempt on the part of the school or the PiL team to buy out some of their teaching time to focus on the training of other teachers. Some schools attempted to support these teachers by forming ICT teams that included technicians and other teachers.

5. *The Fresh Start program should be re-examined to ensure its effectiveness since most of the countries have not received any significant number of donated computers.* The Fresh Start program has not taken off in all five countries in the study. This might be due to the problems of donated computers:
 - a. Lack of a significant number of donated computers;
 - b. Lack of an economical way of re-furbishing donated computers;
 - c. High transportation and maintenance cost of donated computers especially if the schools were far from the major ports; and
 - d. Out-dated computers.
6. *The criteria of the School Agreement program should be revised to encourage individual schools to adopt licensed software and at the same time, the PiL country manager should work closer with the sales department in Microsoft to persuade schools to avoid using multiple copies of license software or/and illegal copies of software.* The number of schools that have signed up for the School Agreement program was below expectation in most of the countries. Although the pricing of the license software might be low, there was little incentive for schools to acquire the licensed copy as many of them were using illegal copies or multiple copies of licensed software.

7. *The PiL country manager should start planning for the sustainability and scalability of the initiative to ensure that the initiative does not cease after 2008.* Many of the country managers of the PiL initiative are caught up in the day-to-day operational issues. In order to ensure the sustainability and scalability of the initiative, they have to start carrying out a cultural audit and creating a strategic plan to see the initiative way beyond 2008.

The implementation of the PiL initiative in the five countries has met with some level of success and hindrance. Overall, there is a constant need to facilitate closer and better collaboration between the different stakeholders within the same ministry. Using ICT as a catalyst for change in education will also require the involvement of different ministries/agencies and/or national/local governments and better open communications between Microsoft and these ministries/agencies. In some cases, the PiL country manager was able to work closely with key champions of the project and this has ensured much better executive support and thus execution. In other situations, the PiL country manager was also able to facilitate discussions and cooperation between different stakeholders within the same ministry. This effort contributed to a much better overview of the project and thus the development of a more holistic framework of involvement and implementation.

Clearly, one of the successful hallmarks of the PiL initiative is that although it may be a global program, the local PiL country manager is able to truly localize the program to meet local needs. In other words, while the key components and strategies may be similar at the macro level, the approach and method of execution of the program vary at the local level. Over the

course of research project, it can be observed that it is this very ability of customization that is contributing to a greater success rate and high impact.

The paper has provided an overview of the PiL initiative in the five countries and highlighted the lessons learned and recommendations. The lessons learnt are to be shared among the five countries and with other countries. Although the education setting of each country is different, the lessons learnt offer certain principles and ideas that may be localized to meet the individual country's needs and situation. At the same time, the recommendations generated provide each country with strategies and ideas to revise and refine its initiative and the various activities under it. Both the lessons learnt and recommendations generated in this paper are part of the formative evaluation process where the activities undergo constant changes to better meet the needs of the stakeholder. It also allows the stakeholders to formulate evidence-based strategies to sustain and scale up the public-private partnership initiative.

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	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Fresh Start	✓	✓	✓	✓	
School Agreement	✓	✓	✓	✓	✓
Teacher Development	✓	✓	✓	✓	✓
Leadership Development	✓		✓	✓	✓
Online Learning Community Portal	✓	✓	✓	✓	✓
Student Helpdesk	✓	✓	✓	✓	
Special Projects		✓	✓	✓	

Table 1: Summary of the PiL Initiatives Across the Five ASEAN Countries