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DBE 3
DECENTRALIZED BASIC EDUCATION
Life Skills for Youth

ANALYSIS OF THE CURRENT SITUATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN JUNIOR SECONDARY SCHOOLS AND NON-FORMAL EDUCATION PROVIDERS

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Acronyms & Abbreviations

BOS	School Operational Assistance Fund
CSTC	Computer Supported Technical Club
DBE	Decentralized Basic Education
ICT	Information and Communications Technology
IT	Information Technology
JSS	Junior Secondary School
LAN	Local-Area Network
LSM	A type of non-Formal Education provider
MGMP	Teachers' Professional Development Networks
MoNE	Ministry of National Education
MoRA	Ministry of Religious Affairs
MP3	Popular Digital Audio Format
MT	*Madrasah* Tsanawlyah, (Islamic Junior Secondary School)
NFEP	Non-Formal Education Provider
NGO	Non-Government Organization
PC	Personal Computer
PDA	Personal Digital Assistants
PiL	Partners in Learning (a Microsoft project)
PKBM	Community Learning Center
PPA	Public Private Alliance
PTA	Parent-Teacher Association
ROI	Return on Investment
SKB	A type of Learning Center (government-run)
SMP	Junior High School (same as JSS)
SMS	Short Message Service
SST	Student Support Technicians
TCO	Total Cost of Ownership
USAID	United States Agency for International Development
VIK	Virtual Internet Kit
VoIP	Voice over Internet Protocol

EXECUTIVE SUMMARY

Scope of the Report

This report details an assessment by the DBE3 Indonesia partners of the uses of Information and Communication Technologies (ICTs) in both the formal schools (Junior Secondary Schools (JSSs) and non-formal education providers (NFEPs) comprising the junior secondary education system of Indonesia.

The assessment was conducted using a mix of field visits, interviews, and a survey focused on a subset of DBE3 target institutions—namely, those JSSs and NFEPs that had been selected as part of cohort 1 of the DBE3 project.

The DBE3 project uses a very broad definition of ICTs. In addition to computers (desktops, laptops, thin clients, etc.) and web and Internet communication technologies that comprise the conventional definition of ICTs, DBE3's definition includes a mix of analog audiovisual technologies and paper-based duplication, printing, and publication technologies. In contrast, the educators at the schools visited during this assessment have a conventional view of ICTs as being a mix of computers, peripherals, software and the Internet. These contrasting definitions may cause difficulties when talking with people outside of the project about ICTs and project staff should make sure that it is clear which definition of ICTs is being used during discussions.

Rationale for the Assessment

The primary purpose of the assessment is to identify avenues for supporting the DBE3 team in its efforts to achieve the project's aim of enhancing life skills of youth in the secondary education system. DBE3's existing ICT-related activities include: a) a one to two day training for teachers in DBE3 target schools and target MGMP (a teachers' network) on using ICTs to support classroom learning (using DBE3's ICT for *Life, Learning, and Work* teacher training module); and b) training teachers to use DBE3's *ICT for Life, Learning, and Work* (LLW) non-curricular activities toolkit (a series of activities teachers or others can use with young people to help them develop and use ICT skills in practical ways). The LLW toolkit is designed for use in non-curricular situations. Additionally, DBE3 has budgeted up to $4,000 for one ICT initiative per target province per cohort, and has discussed with DBE1 and DBE2 about jointly developing an *ICTs for Better Education Toolkit* (a resource that could be a mix of information including tip sheets and learning materials designed to help school and NFEP administrators and teachers make good choices about buying and using ICTs in their schools). The Toolkit can be a relatively low cost and rapid way to help schools and NFEPs improve the return on investment (ROI) from their ICT investments.

It is essential that any intervention in schools and NFEPs be designed and implemented based on an accurate understanding of the situation at these institutions. This assessment helps to understand the "situation" with respect to ICTs in schools and NFEPs. It should help identify and roughly prioritize realistic options that DBE3 might consider pursuing as pilot provincial ICT initiatives and/or public-private alliances.

That said, the assessment also seeks to contribute to USAID's overall DBE program and the broader education improvement efforts being carried out by national and local Indonesian government agencies, non-governmental organizations (NGOs), schools, and communities by

providing information that can help inform plans to use ICTs to improve education in areas such as school management, physical infrastructure, teaching, and learning. It is not possible to ignore the importance of ICTs in schools today. Parents, schools, governments, and donors are spending, and will continue to spend, scarce resources to buy computer technologies, connectivity, and other ICTs for schools. If these resources are not spent well, at best, they are wasted, and at worst, education can be harmed.

Principles Guiding the Assessment

The assessment process and suggestions about what DBE3 may decide to do to enhance the use of ICTs in their schools and NFEPs were guided by the following six basic principles. Any ICT-enhanced or focused activity that DBE3 may design and carry out with their partner schools and NFEPs must be:

- ***Sustainable***—The schools or NFEPs must be able to sustain the use of the technology system.
- ***Affordable***—The proposed technology solutions must be affordable by both the DBE3 project and the schools or NFEPs. The "costs" for solutions should be based on the total cost of ownership (TCO) concept and include:
    - the initial costs to purchase, install, and configure the equipment;
    - the cost to train staff to use and maintain the technology system and integrate it into education programs;
    - the cost of peripherals and software needed to use the equipment;
    - the cost to house the equipment such as building computer labs, buying furniture and storage systems;
    - all ongoing costs with respect to consumables (paper, ink, batteries, etc.), periodic repair and maintenance, and replacement of equipment and the upgrading of software; and
    - the cost to manage this new educational resource.
- ***Replicable***—Since DBE3 will not reach all schools in the targeted provinces, the technology interventions must be designed so that other schools, NFEPs, District Education Offices in the target provinces can replicate them.
- ***Scalable***—Along with being replicable, the proposed ICT interventions must be scalable within different levels of the education system so that District Education Offices, federal agencies, private organizations, and companies can introduce these interventions to larger numbers of schools and NFEPs in locations across Indonesia where the project is not active.
- ***Usability***—The choices of technologies should be made with careful attention to the usability of these tools by teachers and students in schools and NFEPs to help meet the educational objectives of DBE3 and to be compatible with the curriculum at schools and NFEPs.
- ***Useful***—The proposed ICT interventions must deliver educational benefit by enabling schools to provide better-quality teaching and learning and to better prepare students for productive futures after school.

Key Findings of the Situational Analysis

The situational analysis started with the following key questions:

1. What is the overall attitude of administrators and teachers with regard to ICT?
2. What is the status of the infrastructure and ICT equipment in target institutions?

3. What is the existing capacity to acquire and maintain computer systems?
4. How do schools pay for computers and connectivity?
5. What is the existing capacity to use computers and other ICTs for educational purposes?

What is the overall attitude of administrators and teachers with regard to ICTs?
Most administrators and teachers recognize the importance of ICTs and are committed to acquiring them for use in their educational institutions. Most administrators and teachers also recognize the value of ICTs for future employment. Demand from parents to provide their children with computer skills is one of the primary reasons target institutions are integrating computers into their programs.

On the other hand, most educators have a narrow view of ICT use in educational institutions. First, ICTs are perceived primarily as computers rather than as a broader range of technologies that can be used to enhance teaching and learning. Second, computers are viewed as useful primarily for school administration functions and for teaching ICT as a subject. ICTs are not widely considered to be a tool to help improve teaching and learning across the curriculum.

What is the status of the infrastructure and ICT equipment in target institutions?
Overall, NFEPs have significantly less access to the necessary infrastructure and ICT equipment than do JSSs. There are also significant differences across provinces that are worth noting, with some provinces consistently well below average within the assessment pool on key measures, such as access to electricity, telephone lines, and computers. The survey clearly shows that districts in Sumatera Utara are providing less access to ICTs in schools than other districts. On the other hand, Banten, Java Barat, and Java Timur provinces have a strong lead over other provinces and districts in terms of installing ICT in schools.

Where there are computers, they tend to use older operating systems[1], have limited software options installed, and are often not networked. Even fewer computers in educational institutions are connected to the Internet

Percentage of schools surveyed that have…	**JSSs**	**NFEPs**
1. Presence of electricity	100%	90%
2. Presence of telephone lines	89%	42%
3. Presence of computers	87%	44%
4. Computers in a lab	53%	9%
5. Computers linked together in a local area network (LAN)	28% of those who have computer labs	30% of those who have computer labs
6. Computers connected to the Internet	23.5%	0.9%

What is the existing capacity to acquire and maintain computer systems?
Administrators and teachers have very limited capacity to make informed decisions about the selection of appropriate ICT equipment for educational use. School management also lacks knowledge about what is needed after this equipment is purchased to keep it running and to

[1] Nearly all computers examined during the site visits used Windows 98. A few schools with recently purchased equipment had Windows XP. Microsoft provides Windows 98 free of charge to schools. Visits were made before the release of Microsoft Vista.

integrate it into classroom learning. The resulting lack of computer maintenance is a serious problem often resulting in many of the computers at the school not working.

How do schools pay for computers and connectivity?
Lack of funds is the primary reason for schools not having computers or having only a few, not having access to the Internet, and not moving beyond using computers primarily for the *ICT Middle School Course*. For those institutions that do have computers, a range of funding sources (parents, special events, foundation loans, government grants, private sector donations, supplemental fees, etc.) were used to acquire them. Most educational institutions visited had not established budgets to cover recurring costs for maintenance, connectivity or to buy new or replacement equipment.

What is the existing capacity to use computers and other ICTs for educational purposes?
The *ICT Middle School Course* is an optional subject in the curriculum at JSSs and a few NFEPs that focuses on teaching students to use Microsoft Windows, Word, Excel and the Internet. Some schools also offer ICT as a topic of study as a non-curricular activity that seems to be little more than an extension of the *ICT Middle School Course*. For these classes, students work in teams since there are many more students than computers.[2] In some cases, students learn about ICTs without having access to computers. Few teachers, other than the ICT teachers, have e-mail accounts or know how to use ICTs.

Options

Because of the process leading to this assessment report, DBE3 included Option 2, described below, in its revised, and approved *Detailed Implementation Plan* and has started planning and developing it. DBE3 and USAID have also decided to move forward on Option 1 in partnership with Intel. The project team, in collaboration with USAID and the Ministry are now reviewing options 3 through 7 for possible implementation.

Even though DBE3 schools and NFEPs face multiple challenges when using ICTs in education—especially computer and Internet technologies—there are some important opportunities available to DBE3 (and the other DBEs) to leverage the power of ICTs to enhance education and improve school management. A long list of possible interventions was presented to the DBE3 team after the field visits (see Appendix A). From this list, the team selected seven of these opportunities for detailed consideration that they believed offered the greatest immediate benefit to the majority of DBE3 schools and NFEPs at the lowest cost and was possible within the context of DBE3. In other words, these seven opportunities have an expected high rate of ROI while also being sustainable by schools and national and district-level organizations. These seven options are explained in detail below.

Option 1: The Intel Teach™ Program

The *Intel Teach* program focuses on formal education (K-12), and is designed to help teachers use student-centered methods of instruction in their classrooms. Intel plans to launch their *Teach* program in Indonesia with two main training components: *Getting Started* (the basic course) and the *Essential Course*. The Ministry of National Education (MONE) recently started

[2] It is important to note that even though students work in teams to allow greater access to equipment, it appears that teachers are not using these teams to advance learning through active peer teaching and teamwork activities.

an initiative with Intel to launch the *Getting Started* course for public high school teachers and the *Essential Course* for vocational school teachers. Intel and the Ministry signed an MOU on May 8, 2007, and Intel's senior trainers will train the first batch of trainers using the *Getting Started* materials in English. The translation of *Getting Started* into *Bahasa* Indonesia will be ready by July 2007, and MONE will review this to ensure localized contents are included by August. The first training using *Bahasa* Indonesia materials under the Intel-MONE program will start in September. Also starting in September, DBE2 will collaborate with Intel to pilot an approach to train primary school teachers using the *Getting Started* materials under a USAID-Intel Memorandum of Understanding (MOU), and, following the pilot, seek to scale-up the training with primary school teachers in DBE target districts. DBE3 wishes to join the pilot activity (and subsequent scale-up) by training teachers in JSSs in DBE target areas.

The *Getting Started* course from the Intel *Teach* program would provide an excellent foundation for DBE3's *ICT for Life, Learning and Work* module and toolkits. The ICT module is about building awareness and getting teachers prepared for 21st century skills, while the ICT toolkits deal with how to take advantage of ICT in the learning and teaching process. The *Getting Started* course would come between the module and toolkits, in that it covers basic skills in computer use that would allow teachers to take full advantage of both the *ICT for Life, Learning and Work*, and the *ICT for Better Education Toolkit* proposed below.

Like DBE2, DBE3 would most likely contribute to the training by covering the costs of printing materials, the training venue, logistics, participant costs, and site preparation. DBE3 would need to define a strategy for how to roll out the training at the district level, and for ensuring sustainability of the trainings and government ownership of the program. Together with the first launch of DBE2 trainers, Intel will provide technical assistance and follow-up activities for a training-of-trainers. Together, Intel and DBE3 staff will collaborate on the evaluation of this pilot.

Option 2: ICT Toolkit for Better Education

The *ICT Toolkit for Better Education* activity creates both physical and digital versions of a Toolkit that includes a mix of information, tip sheets, and learning materials designed to help school and NFEP administrators and teachers plan, implement, and use ICT resources to improve school management, teaching, and learning. Some of the benefits include:

- improved decision making about buying and using ICTs in schools;
- more effective management of ICT resources;
- better-maintained equipment;
- a larger selection of software available for students and teachers to use;
- improved use of existing and future ICT resources; and
- an increase in the educational ROI from these resources.

This Toolkit (which is different from the toolkit for the *ICT for Life, Learning, and Work* training module) could be developed in collaboration with the other DBEs and Pustekom. This is actually a meta-activity that includes multiple integrated ICT activities. Two versions of the Toolkit could be developed for DBE3, one for formal schools and one for NFEPs. It is important to note that this Toolkit will be most effective, in both development and implementation, if Pustekom agrees to partner with DBE3 to co-develop these materials and covers most or all of the production costs to publish enough Toolkits for all DBE3 schools and NFEPs. DBE 3 staff can also provide personnel and other resources to build the capacity of Pustekom staff to develop Toolkit resources.

Option 3: Virtual Internet Kit

The Virtual Internet Kit (VIK) would consist of a set of CD-ROMs and/or DVDs containing high-quality educational web sites (mostly in *Bahasa* Indonesia) that would be installed on individual desktops at schools and NFEPs or on a computer lab's server for students and teachers to share. The VIK would provide students and teachers in schools and NFEPs without access to the Internet or very limited access with simulated Internet access. Students and teachers would access and navigate these stored web sites using Internet browser software in exactly the same way as they use the Internet though a live Internet connection and thus enhance their Internet skills. This activity might also include a teachers' guide to help teachers use this resource and integrate the selection of the web sites into their different subjects. At the same time, teachers and students can be encouraged to take copies of this resource home for use on their home computers. Due to the limited amount of Internet information in Indonesian, this activity would work best if it were integrated with English language classes.

Option 4: Student Support Technicians

One of the biggest problems with using computers in schools and NFEPs is maintaining equipment. At the same time, to increase the ROI from computer systems in schools and NFEPs, this expensive equipment must be used in more and creative ways to achieve educational benefit. It is also important for schools and NFEPs to find ways to improve their students' employability skills. All three of these objectives can be achieved through the Student Support Technicians (SSTs) activity. This activity develops and pilots a program to create Computer Support Technical Clubs (CSTCs) at schools and NFEPs.[3] The CSTCs will be an extracurricular activity allowing students to gain practical skills in maintaining, troubleshooting and fixing basic computer problems. In the process of learning these skills, the students in the CSTCs will help maintain the school's computer systems. When CSTCs members graduate from their school or NFEP, they also receive a CSTCs Certificate of Achievement from the DBE3 and core IT company partners.

Option 5: Photography and Digital Imagery for Learning

The principal goal of this activity is to improve teaching and learning through the more effective use of images, diagrams, and pictures. This activity is possible for schools and NFEPs with or without computers. For schools with no or very limited access to computers, this activity would make use of film cameras and/or tape recorders and paper for presentation. Schools with computers could use film and/or digital cameras, scanners, audio recording software and CD-ROMs, Power Point or web pages for presentation. Depending on need and local capacity, teams of teachers and students could integrate the use of photography, drawing and sound in learning projects to present complex topics so that they can be quickly understood. Where computer technologies are present, students and teachers could develop interactive web pages, Power Point presentations or CD-ROMs to present information using a mix of photographs, text, diagrams and audio. These interactive presentations could be shared with other schools and be used to enhance teaching and make learning more active and participatory. For more advanced topics, DBE 3 could work with the teachers, students and local companies to create more substantial CD-ROM learning environments that present complex concepts using a mix of sounds, text, audio descriptions, diagrams, photographs, and animation. This activity will build

[3] AED is implementing a similar activity with CSTCs in schools in Macedonia with great success.

the pedagogical and technical capacity of teachers to create and integrate visual material into their teaching and learning materials, and it will build the physical capacity of schools to create visually interactive learning materials (paper-based and digital) as well. The primary outcome of this pilot is improved teaching and learning as teachers in the pilot schools and NFEPs start creating and integrating images, diagrams, and photos into their learning materials.

Option 6: Instructional Materials Production

None of the schools or NFEPs visited had the capacity to produce and publish paper-based learning materials for students. This activity will work with schools and NFEPs to establish a training program with equipment to provide schools with the capacity to develop and produce low cost instructional materials to improve classroom teaching. This pilot will use both digital and analog technologies and equipment that does not require electricity. The principal outcome of this pilot is an affordable and sustainable learning materials production system using ink and stencil duplicators (see Appendix C) to enable educators to produce and duplicate learning materials to improve education. This activity could be scaled up across DBE3 and other schools in Indonesia. If it is successful, the pilot will also result in developing a training module to build and strengthen the capacity of educators to create and duplicate high-impact leaning materials for their students using a mix of digital and analog technology.

Option 7: Pilot Alternative Computer Technologies

In partnership with Intel or other companies, this activity will develop a program to pilot the use of the Community PC or other devices such as the Classmate PC (see Appendix D) that Intel has helped design for use in schools or other innovative technologies in schools and NFEPs. Intel's low-cost Community PC is more durable in harsh conditions than conventional computers and is easier for schools to maintain. The Classmate PC is a low cost portable computer for use in classrooms. This pilot may also include a solar technology power option, possibly in partnership with Boeing's Spectrolabs, for schools in remote areas with no access to electricity. One of the outcomes of this pilot activity of alternative computer technologies will be to develop strategies that can be used to advise schools and NFEPs on the best technologies to buy for educational uses and strategies for maintenance. Through lower-cost technology options, more schools and NFEPs will be able to provide students and teachers access to computers.

1. PURPOSE AND NATURE OF THE ASSESSMENT

1.1. Purpose of the Assessment

The purpose of the Information and Communication Technology (ICT) assessment was twofold:

- To understand the current situation with regard to the availability and use of ICTs in DBE3 target institutions—a **situational analysis**; and
- To develop options for ICTs enhanced activities adapted to the conditions identified through the situational analysis—an **options paper**.

Rationale for the Situational Analysis

There are a lot of beliefs and broad assumptions about the presence and use of computers and other technologies in Indonesian schools and NFEPs. Many of these assumptions and beliefs are incomplete, not true, or inaccurate. It is essential that any intervention be designed and

implemented based on an accurate understanding of these valuable and useful technology resources for schools and NFEPs.

Rationale for the Options Paper
In addition to understanding what the challenges and opportunities are, it is important to have a set of optional activities that are viable within the context of project schools and NFEPs and that will contribute to achieving the educational improvement goals of DBE3. Given what the situational analysis uncovered, what could DBE3 or others do? What options would make the most sense and provide the most value added or return on investment (ROI)?

We can no longer ignore the importance and/or presence of ICTs in Indonesian schools today. Parents, schools, governments, and donors are spending, and will continue to spend, scarce resources to buy computer technologies, connectivity, and other ICTs for schools. If these resources are not spent well, at best, they are wasted, and at worst, education can be harmed.

Target Audience
Although the primary focus of this assessment is to help the DBE3 team achieve the objectives of this project, the assessment also seeks to contribute to USAID's overall DBE program and broad education improvement efforts carried out by national and local Indonesian government agencies, other non-governmental organizations (NGOs), and schools.

1.2. Methodology

The data collection components included a mix of field visits, interviews, and a survey.

Field Visits and Interviews

The initial data collection, which took place in November 2006, involved a mix of meetings in Jakarta; site visits to DBE3 target institutions in two provinces; and discussions with staff from DBE3, USAID, and other DBE projects. Nine Junior Secondary Schools (JSS) and three Non-Formal Education Providers (NFEP) were visited.

Survey of DBE3 Target Institutions[4]

A survey of DBE3 target institutions was carried out to supplement information collected during the site visits. This survey used a questionnaire that was administered to all DBE3 target institutions that had been identified by September 2006 (see Appendix E). These DBE3 target institutions comprise the first of three distinct cohorts of institutions that will receive DBE3 support over the life of the project. This first cohort represents a sample of JSS and NFEPs; 103 JSSs and 108 NFEPs were surveyed (see Appendix F and G).[5]

Questions Addressed by the Situational Analysis

1. What is the overall attitude of administrators and teachers with regard to ICT?
2. What is the status of the infrastructure and ICT equipment in target institutions, (including issues such as power/electricity, hardware and peripherals, operating systems, software, communication, and connectivity)?
3. What is the existing capacity to acquire and maintain computer systems?

[4] Within the context of the DBE3 project, target institutions include public, private, and religious upper elementary schools, referred to as Junior Secondary Schools (JSSs) in the text, and non-formal education providers, referred to as NFEPs in the text.
[5] More details about these institutions constituting the first cohort of DBE3 target JSS and NFEPs are included in Appendix G.

4. How do schools pay for computers and connectivity?
5. What is the existing capacity to use computers and other ICTs for educational purposes (including ICT as a curriculum subject and as a tool for learning in all subjects)?

Principles Guiding the Development of Options

- ***Sustainable***—The schools or NFEPs must be able to sustain the use of the technology system.
- ***Affordable***—The proposed technology solutions must be affordable by both the DBE3 project and the schools or NFEPs. The "costs" for solutions should be based on the total cost of ownership (TCO) concept and include:
  - the initial costs to purchase, install, and configure the equipment;
  - the cost to train staff to use and maintain the technology system and integrate it into education programs;
  - the cost of peripherals and software needed to use the equipment;
  - the cost to house the equipment such as building computer labs, buying furniture and storage systems;
  - all ongoing costs with respect to consumables (paper, ink, batteries, etc.), periodic repair and maintenance, and replacement of equipment and the upgrading of software; and
  - the cost to manage this new educational resource.
- ***Replicable***—Since DBE3 will not reach all schools in the targeted provinces, the technology interventions must be designed so that other schools, NFEPs, District Education Offices in the target provinces can replicate them.
- ***Scalable***—Along with being replicable, the proposed ICT interventions must be scalable within different levels of the education system so that District Education Offices, federal agencies, private organizations, and companies can introduce these interventions to larger numbers of schools and NFEPs in locations across Indonesia where the project is not active.
- ***Usability***—The choices of technologies should be made with careful attention to the usability of these tools by teachers and students in schools and NFEPs to help meet the educational objectives of DBE3 and to be compatible with the curriculum at schools and NFEPs.
- ***Useful***—The proposed ICT interventions must deliver educational benefit by enabling schools to provide better-quality teaching and learning and to better prepare students for productive futures after school.

What Do We Mean by ICT?

The DBE3 project is using a broad definition of ICTs. In addition to computers (desktops, laptops, thin clients, etc.) and web and Internet communication technologies (web sites, Voice over Internet Protocol [VoIP], collaboration technologies, etc.) that comprise the conventional definition of ICTs, DBE3's definition includes a mix of analog audiovisual technologies (cassette players, recorders, video/TV systems, film cameras, etc.) and paper-based duplication, printing, and publication technologies (photocopiers and spirit/ink/stencil duplicators[6]). The DBE3 definition of ICTs also encompasses a mix of digital audiovisual technologies, including digital cameras, pod casting/MP3[7] technologies, scanning and electronic printing technologies,

[6] See Appendix C to learn more about ink and stencil duplicators.

[7] MP3 is a digital audio format used for music, talking books, or other audio content. MP3 is the format used for pod casting.

publishing-on-demand technologies, SMS[8] and cell phone technologies, and PDAs[9] and handheld computers. The focus of the DBE3 definition of ICTs is identifying the optimal and most sustainable technology solution(s) for the educational challenges that are to be addressed within the realities of the local environment at schools and surrounding communities (physical, economic, energy, skills, etc.).

This comprehensive definition is useful for DBE3, since it expands the spectrum of technologies that can comprise interventions to help schools and NFEPs improve education. However, it is important to note that the schools and NFEPs with which DBE3 works—and Indonesia in general—define ICTs much more narrowly to include only computers, Internet, and related digital technologies (digital cameras, scanners, printers, etc.). When DBE3 staff members speak with staff at schools, NFEPs, and other partner organizations, it is important that they carefully explain the project's broader definition of ICTs. This will help avoid possible problems, such as, raising expectations that all ICT interventions will include computers and/or Internet access.

2. SITUATIONAL ANALYSIS

2.1. What is the overall attitude of administrators and teachers with regard to ICTs?

One poor rural school the assessment team visited had acquired two computers. One, in the office, was being used for administrative functions. The other was kept in a small room so staff could show students a computer and provide some basic information on how to use it.

Recognition of the importance of ICTs and a commitment to acquiring ICTs for use in educational institutions.

One of the most striking and common characteristics of the leadership at JSSs and NFEPs visited is that all of them are either actively working with computers or trying to determine how to integrate computers into their educational institutions. All but one of the places visited (one NFEP that focused on auto mechanics, TV/radio repair, driver education, and the teaching of Packet B) felt that it was very important to teach students to use computers. All of these education providers are also working hard to provide their students access to computers and instruction on how to use computers.

In short, nearly all schools are doing what they can to provide students some level of access to computers regardless of the severe financial and knowledge constraints that most of the schools and NFEPs visited faced. In addition, all of these education providers are committed to increasing access to computers and to improving the quality of how these technology investments are used.

Recognition of the value of ICT skills for future employment

This commitment to bringing computer technologies into the schools or NFEPs is also reflected in a belief that learning about computers and Internet technologies is an essential part of middle

[8] SMS is Short Message Service or text messaging on a cell phone where the keypad on the cell phone is used to type short messages (about 150 characters and spaces) to other cell phones.

[9] PDA—Personal Digital Assistant—is a handheld digital/computing devices, such as a Palm or an iPAQ, that is used to track personal data and produce and present digital content. Some PDAs also function as cell phones and connect to wireless networks and/or to the Internet as well and can send and receive e-mail.

school and non-formal education and preparing young people for the world of work. All teachers and administrators surveyed felt that it is very important for students to have some level of ICT skills (seen as computer skills), so they are prepared for future jobs.

This interest in having computers has been reinforced with the introduction of life skills in the new curriculum. Most staff at the JSSs and NFEPs visited felt that computer skills are essential life skills. All but one of the NFEPs are also planning either to bring computers into their program, if they had none at the time of the visit, or to increase the number of computers available to students.

Pressures from parents

Parents' demand to provide their children with computer skills is one of the main reasons that schools and NFEPs are adding computers to their programs. In four of the schools and NFEPs visited, parents were responsible for buying some of the computers used in the schools. In one government school, the parents also increased the amount of their school fees so that the school could buy more computers for students to use, maintain the computers that were already at the school, and buy consumables.

All of the JSSs visited want to be able to offer the optional ICT curriculum, even if they were not yet able to do so at the time of the visit.

> One Islamic private school had created a small computer lab two years ago to offer the ICT curriculum. It was now struggling to secure access to the Internet so it could complete the third year of this curriculum, which includes instruction in the use of the Internet and e-mail.

Because of the diversity of the schools and NFEPs, even in rural areas, parents have choices about where to send their children, and, as a result, some schools, especially private ones, struggle to maintain a sufficient level of enrollment to pay salaries and allow the school to remain competitive. Most schools said that having computers gives them a competitive advantage and is responsible for either increasing or maintaining their enrollment. Schools and NFEPs with computers feel that if they did not have them, their enrollments would fall.

Lack of understanding of the role of ICT in improving teaching and learning

In contrast to the intense desire to bring computers into their organizations, none of the educators encountered during the field visits view computers as an important tool to improve teaching and learning in subjects other than ICT. JSSs and NFEPs seem to have a very narrow view of ICTs within education; they believe it is useful for school administration, for teaching the *ICT Middle School Course* and for providing students with basic ICT skills. In all cases, JSSs and NFEPs define ICTs as computers and related equipment and software and the Internet. For those few schools with access to the Internet, administrators communicating by e-mail is also seen as an appropriate use of ICTs. None of the educators met during the site visits saw any value in using ICTs to enhance the teaching of subjects other than the formal ICT curriculum. In addition, none of the schools visited that had computer labs reported that teachers from other subjects used the labs. One school reported that their geography teacher used a computer and a projector to show his Power Point lectures.

One DBE3 activity seeks to help address this issue by creating a training module for teachers on ***ICTs for Life, Learning, and Work*** and carrying out intense workshops with teachers. The purpose of this one-day training module is to provide teachers with basic awareness of ICTs

and to introduce them to possible ways of integrating ICTs into their teaching through the use of project-based learning.

2.2. What is the status of the infrastructure and ICT equipment in target institutions?

Overall, NFEPs have significantly less access than do JSSs to the necessary infrastructure and equipment to use ICTs effectively, with significant differences across provinces.

Power/Electricity

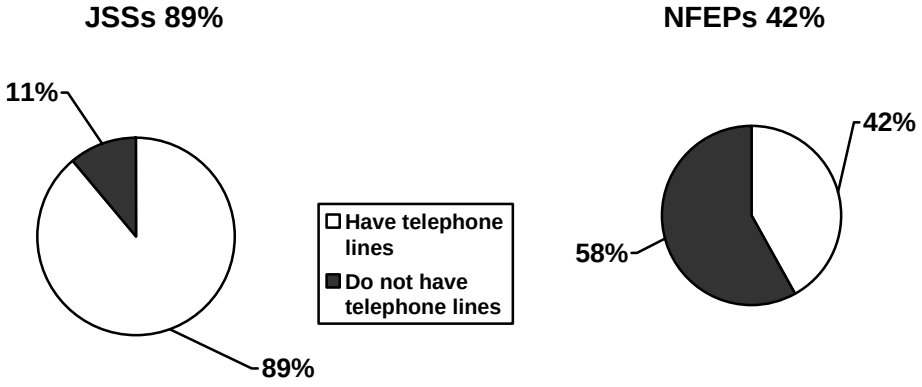
All JSSs and all but five NFEPs have electricity. Four of the five NFEPs without electricity are in the province of Sulawesi Selatan.

Telephone Lines/Landlines

NFEPs have less access to telephone lines than do JSSs.

Telephone Lines

Graph 1: Percentage of Junior Secondary Schools and Non-Formal Education Providers with Access to Telephone Lines



Notes on Graph 1: These aggregates hide significant differences across provinces. For example, only 16% of NFEPs in the province of Sumatera Utara have telephone lines, whereas 100% of JSSs in the province of Banten have telephone lines.

Hardware and Peripherals

All but one of the schools and NFEPs visited had at least one TV and video system, which is kept in the principal's office. However, only one institution visited, an NFEP, reported that they had a collection of educational TV programs on DVDs from Pustekom[10]. The use of educational programs on DVDs could be a powerful way of rapidly providing students and teachers with quality content to improve learning.

One approach to this might be to map the curriculum to identify critical concepts that teachers have a difficult time teaching and students find challenging to learn. Then, after prioritizing these concepts, Pustekom could possibly work with DBE staff to design how best to present this content within an authentic Indonesian context for delivery via DVDs. To be most effective, it would be essential to provide a teachers' guide to help teachers integrate the TV lessons into their routine instruction. The learning impact can increase if the TV program incorporates

[10] Pustekom is a federally funded institution that develops educational multimedia and TV programs for use in schools.

pauses, as in Interactive Radio Instruction, which enables the teachers and students to discuss items, answer questions or respond to prompts in the program. Because of the costs involved in producing quality TV instructional material, it is essential that they move beyond conventional "baby sitting" TV programs to become interactive learning guides. It is all too easy to have students spend 45 minutes watching an educational TV program and believe that they have learned anything. Effective learning requires that that learner is actively involved in the process of learning, not just being a passive observer.

In addition to developing original educational TV programs, it would be important to survey the best topic-specific educational TV programs to select those that cover topics that would be difficult for local production. Then, once the rights to use were obtained, Pustekom could either use voice over or sub-titles to create localized versions of these programs for use in schools. Again, providing teachers' guides would be essential.

To be truly effective, training in the use of TV to enhance learning would need to become part of regular pre-service and in-service professional development programs.

A few schools have one or more cassette/CD/radio players available for use by teachers in classrooms. In one school, three new tape players/recorders were kept in a storage cupboard in the teachers lounge. The English and Indonesian language teachers reported that they used these as part of listening comprehension exercises. No schools reported using overhead projectors or other non-computer ICTs as a routine part of teaching.

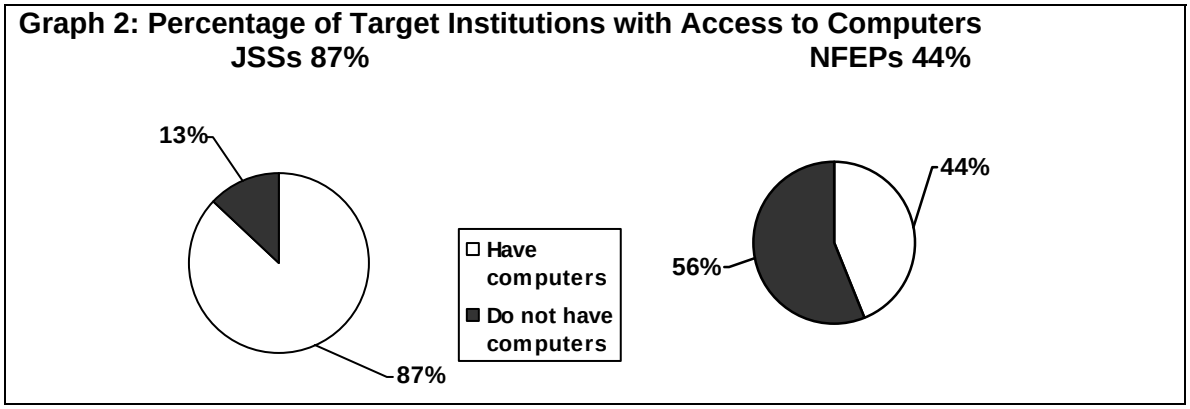
During visits, most of the schools and NFEPs were using digital cameras or the cameras in the cell phones to take pictures. Only one of the schools visited used a traditional film camera. None of these schools and NFEPs report using their digital or film cameras for educational purposes other than photographing school functions for promotional or reporting purposes.

None of the schools visited has photocopiers or ink/stencil duplicators to produce paper materials for use in classrooms. The schools report that when they need copies they use local stores to provide photocopy services. Computer printers were only evident in school or NFEP offices. Printers that were in computer labs were not working.[11]

[11] One of the most common problems with using printers in schools is that dust and insects fall into the paper feed mechanism if it is vertical and eventually causes the print to fail. In other countries, when schools and other facilities switched to printers with horizontal paper feed mechanisms they have very few mechanical problems with printers.

Access to Computers

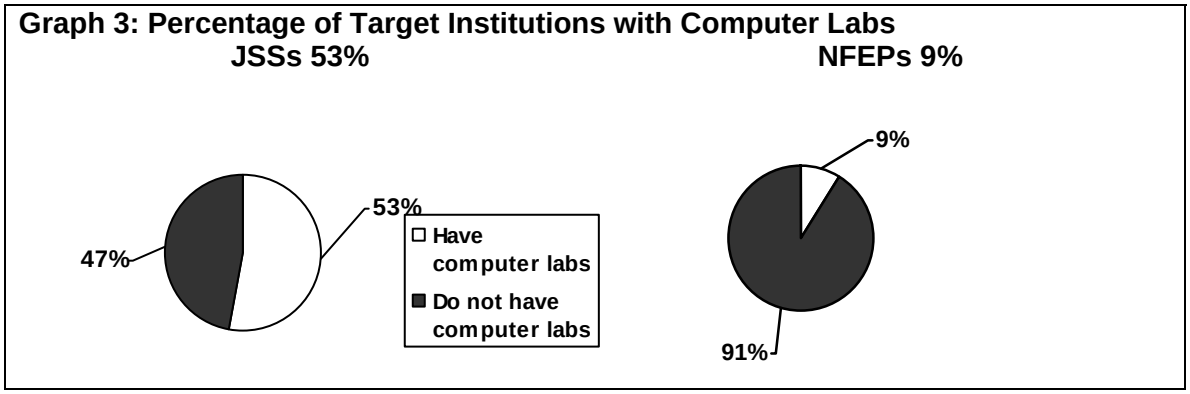
Graph 2: Percentage of Target Institutions with Access to Computers



Notes on Graph 2: There is significant variation across provinces. For example, 100% of the JSSs surveyed in the Banten province have computers. At the other extreme, only 17% of NFEPs surveyed in the Sumatera Utara province have computers.[12] For those target institutions that have computers, the number of functioning computers can range anywhere between one and 52 for JSSs and one and 23 for NFEPs.

Computer Labs

Graph 3: Percentage of Target Institutions with Computer Labs



Notes on Graph 3: Of the JSSs with computer labs, only 15 of 54 (~28%) have their computers connected to form a local area network (LAN). Of the NFEPs with computer labs, only three of 10 (~30%) have LANs. Much of the equipment found at JSSs and NFEPs during field visits did not have the physical capacity to be connected to a LAN.

Other ICT Systems and Tools

In terms of using ICTs other than computers, some 60% of schools report using televisions with a DVD/VCR player to enhance education, with the exception of schools in Sumatera Utara. Twenty-five percent of schools in each district report using radio cassette/CD players in education, and only a few schools report (< 5%) using simple radios in education. All districts report using at least one overhead projector. Few if any schools (< 5%) use LCD projectors, however, and almost none of the districts uses laptops, movie projectors, or fax machines to enhance teaching and learning. Most schools (> 90%) use printers to assist with teaching and

[12] More detailed tables are provided in Appendix G.

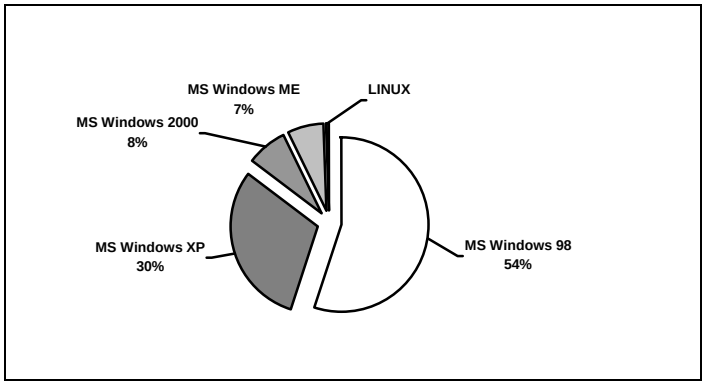
learning or to create learning materials. Less than 5% of schools report using a scanner or photocopier, and the same can be said for the remaining equipment categories.

More than 90% of schools report having an actively used and managed library, with the exception of one school in Sumatra Utara, which rates its library as “fair.” More than 90% of respondents agree that the lack of money, space, knowledge, and skills are key reasons for not having computers. The survey clearly shows that schools in Sumatra Utara provide less access to ICTs than schools in other districts. In contrast, Banten, Java Barat, and Java Timur provinces have a strong lead over other provinces and districts in bringing computer technologies to their schools.

Operating Systems, Software

Most institutions use a mix of operating systems. Microsoft Windows 98 is the most common since it is available to schools without charge. As schools buy new computers, Windows XP will become more common and it is likely that Microsoft Vista will start appearing. Only one institution surveyed uses LINUX as its operating system. As schools buy equipment with Microsoft XP or Vista it will become increasingly difficult for them to maintain equipment since they will have to be managed by different systems with different software. This could increase costs and cause school staff to become frustrated with trying to use computers.

Graph 4: Distribution of Operating Systems Used by Schools



Application Software

Aside from the utilities and basic applications that come with Windows operating systems, Microsoft Office is the only type of software application on the computers at the schools and NFEPs visited. This is disappointing since there is much more to using computers than just using Office. This limited focus on Office supports the belief by the authors that schools and NFEPs are not achieving an acceptable level of educational benefit from their investment in computers. It also means that students who are learning about computers are not gaining the broad spectrum of skills that will prepare them for future employment.

Different possible explanations for the absence of any other applications on school and NFEP computers include:

- Schools do not have the money to buy other software applications from either legitimate dealers or pirates.

- Staff at the schools do not know about other software applications that could add educational value to the use of computers or utilities that could improve management and maintenance of their computers.
- Staff have been told not to add any software applications for fear of viruses and associated problems.
- Since most schools with computers only use their equipment to teach the *ICT Middle School Course*, and since the curriculum only includes topics on using MS Office software, there is no reason to install other applications.
- Since few schools have access to the Internet, and almost none have high-bandwidth connections, they have little or no access to free and open source software that could be found and downloaded from the Internet.[13]

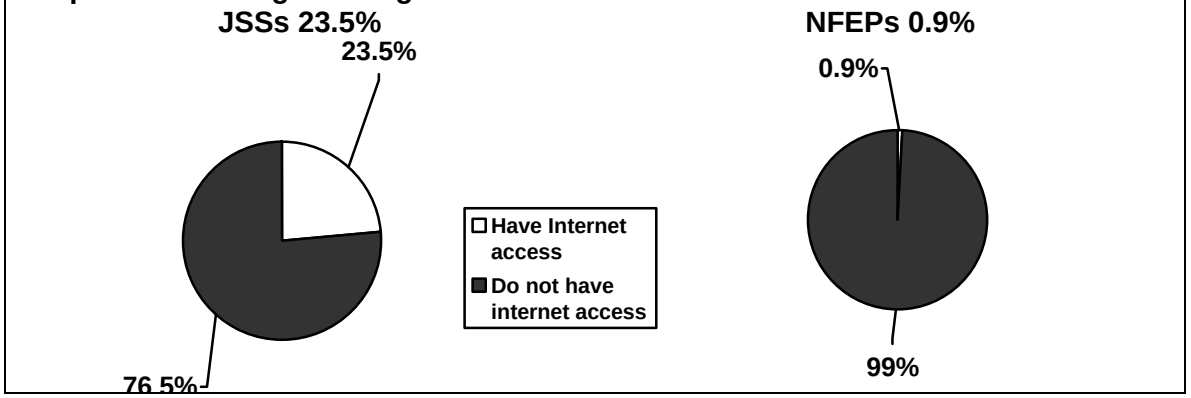
Open Source Software

None of the JSSs and NFEPs visited and interviewed are using any type of open source software or freeware. This is unfortunate since the lack of money at schools to buy software (even pirated software) means that school computers have no software except for the Microsoft operating system and Office. The complete absence of any other software limits how teachers and students can use their computers to enhance education and to prepare for using technology in the world of work. It appears that there are no training programs or information available to teachers about using open source software for education. In addition, there seems to be no organization or agency collecting, organizing, reviewing, compiling, and distributing open source software that may be useful to schools and NFEPs. In the absence of schools receiving open source software by CD-ROM, schools and NFEPs need to identify and download software on the Internet. However, the lack of Internet access and the cost of using commercial providers mean that schools have essentially no access to these resources. These factors make it virtually impossible for teachers to learn about open source and to experiment with using free software to enhance education.

Communication, Connectivity and Internet Access

Internet access is very limited, and it is almost non-existent for NFEPs. Less than 24% of JSSs have Internet access, and less than 1% of NFEPs have Internet access.

Graph 5: Percentage of Target Institutions with Access to the Internet



Notes on Graph 5: Most of the JSSs that have Internet access use dial-up and usually only one computer is connected. Most JSSs and NFEPs view Internet access as an unattainable luxury. Schools and NFEPs seeking to bring Internet access to their institutions believe that

[13] Access to open source software is also available via CD-ROMs and DVDs.

the only type they can ever afford is limited dial-up access. Unfortunately, dial-up access severely limits the number of students who can use the Internet at any one time. In addition, the general lack of networked computers prevents target institutions from sharing a connection to the Internet.

Thinking Ahead about Internet Use

In planning for eventual access to the Internet, it is important to provide schools and NFEPs with software and training so they can protect their systems from viruses, spyware, and spam. When schools in other countries first gain access to the Internet, problems with computer viruses and spyware can quickly make their computer system unusable. Even when antivirus software is available, the lack of skills and a culture of routinely updating virus definitions and running anti-virus scans often prevent schools from keeping their systems in running order.

Limited Use of WarNets

Some teachers report using privately owned WarNets[14] for Internet access to send and receive personal e-mail. However, many staff report they never use the Internet and do not know why they would use it. The cost of using WarNets for Internet access is relatively low for limited use.

2.3. What is the existing capacity to acquire and maintain computer systems?

Selecting Equipment for School Use—Lack of Knowledge

Interviews during field visits with principals and teachers at JSSs and NFEPs revealed that they believe it is important to bring computers into their organizations. Most also know they have to create educational programs about ICTs to give their students access to these basic skills. There is a palpable sense of urgency at many of the schools and NFEPs about increasing student access to computers.

Unfortunately, school and NFEP staff and leadership generally lack the knowledge needed to select ICTs that are best suited to their schools' needs, the knowledge to use ICTs in education effectively, and the skills to use and maintain computers so their investment is not wasted. They seem to rely primarily on vendors to provide the equipment they need and help them install the systems at schools. As a result, schools and NFEPs often seem to buy

Offline Internet: None of the schools or NFEPs were using copies of web sites stored on their computers to provide students and teachers with access to Internet resources. This type of simulated Internet on school computers is commonly used in other countries where access to the live Internet is limited by cost or availability. In Rio de Janeiro, for example, a government agency created a CD-ROM disk with 100+ educational web sites that schools copied onto their computers to use. The students and teachers then used their Internet browser to navigate these stored sites, just as they would on the live Internet. The teachers could plan how to use these sites in lessons, and students could gain research and Internet use skills. If limited access to the live Internet was available at the school, students could jump from their stored web sites to live resources as needed. Because of the speed of using the stored web site, students were able to accomplish much more work than they would have by using the live Internet alone. This strategy may prove useful in Indonesia.

[14] WarNets are Indonesia's version of cybercafés.

equipment that is not optimally configured to meet their educational needs or that can withstand heavy student use.[15] It is possible that some schools are not getting the equipment they are paying for and believe they have ordered. A lack of knowledge, however, makes it impossible for the schools and NFEPs to be effective consumers of computer equipment that meets their needs. Once schools have their computers, a lack of knowledge and skills contributes to serious problems with maintaining the equipment, keeping it running effectively, and deriving sufficient educational benefit relative to the cost of the investment.

Inaccurate Knowledge: At one school, the computer teacher was asked why the computers in the lab were not connected together to form a network. He responded by saying that connecting computers in a network causes excess stress on the hard drives and results in more maintenance problems. This belief is incorrect.

It is likely that schools will continue to spend scarce resources to buy new equipment, yet little is being done to help close the ICT skills and knowledge gap at these schools and NFEPs. As a result, the ROI on ICT investments in schools will likely continue to fall short of expectations.

For the DBE3 schools and NFEPs, the project should carefully consider how to address this knowledge and skills gap as part of any intervention involving the use of existing equipment or the provision of additional equipment.

Maintaining and Repairing Equipment

As mentioned earlier, one of the most severe computer-related problems facing schools and NFEPs is maintaining the equipment and keeping it operational. It is important to note that some schools reported that failure of hard disks was their most difficult and common problem they faced. Part of this difficulty is likely related to the relatively high cost of replacing hard disks. However, the high level of failure reported by the schools and NFEPs visited is greater than what should be expected.

There are three possible explanations for this problem with hard drives:

1. The drives supplied with the computers were either refurbished or inexpensive, low-quality drives that had short life expectancies. As a result, they failed at a much higher rate than would normally be expected.
2. The combination of excess dust and lack of air conditioning in the computer facilities means that the equipment operates at increasingly higher temperatures as dust collects on the drives, motherboard, chips, etc. The accumulation of dust prevents the systems from dissipating heat efficiently, so

Numbers of Computers in Schools vs. Numbers of Functioning Computers

In one school, the principal reported that the school had 16 computers in its computer lab. The computer teacher told the assessment team, however, that only eight of these systems were working. When the eight systems were tested, only four were fully functional. During the visit, the computer teacher was re-imaging one of the computer's hard drives, and we talked about the problems he was having keeping the two-year-old equipment operational. During this discussion, he reported that hard disk failure was the most severe problem he faced. He also said that the school had no budget for computer maintenance, and repairs were made only when ad hoc funds could be found.

[15] Most computers are designed and built for office use with clean and secure environments with relatively low intensity of use. Schools in Indonesia provide much more challenging environments for computes and students generally use computers much more intensely than office workers do. As a result, conventional computers, especially low cost computers, often fail quickly.

they gradually overheat. In increasingly higher temperatures, all devices in a computer fail more quickly than when they are used in cleaner, cooler environments.[16]

3. The drives are not really failing, but corrupt data prevents the computer from starting properly. The technician then either does not know how to diagnose and repair the drive or chooses to replace it to make more money than it would cost to repair the drive. Schools may also only be "buying" a reformatted drive when told their drive has to be replaced.

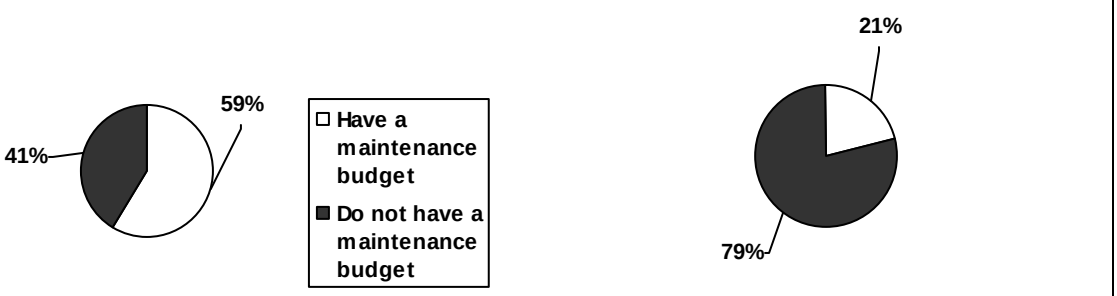
Computer hardware problems resulting from overheating can be expected to increase in schools and NFEPs in Indonesia in the future. Each new generation of computers comes with faster CPUs that produce more heat, so it is increasingly difficult to keep newer computers cool under the best possible conditions.[17] In harsh environments where air temperature can be very high and dust is not controlled, overheating can be a very serious problem, leading to premature failure of critical components. This situation will make it increasing expensive for schools and NFEPs to purchase conventional desktop computer systems. One of the options proposed for DBE3 is to pilot Student Support Technician Clubs (SSTCs). Students in these clubs could be taught to periodically clean the dust from computers to help manage this problem.

2.4. How do schools pay for computers and connectivity?

School Budgets

None of the schools or NFEPs visited reported having a specific budget line item to support the purchase of computers, connectivity, supplies, or for maintaining computer facilities and equipment. In the survey, however, 59% of the JSSs and 21% of the NFEPs report having a budget for computer maintenance.

Graph 6: Percentage of Target Institutions with a Computer Maintenance Budget



Notes on Graph 6: Target institutions often fail to allocate a computer maintenance budget. The absence of a specific annual budget to support computer resources results in gradual degradation of these educational assets as equipment fails and is not repaired. In addition, the absence of a budget line item for computer resources means the school cannot plan to improve its facilities, replace old equipment, buy new software, and retain access to the Internet. School leaders need help to modify their school budgets to incorporate line items to purchase and maintain computer equipment and other ICT resources.

[16] Air conditioning is not required to use computers in Indonesian schools as long as dust is controlled and computers are occasionally cleaned (inside) to prevent the build-up of dust and overheating.

[17] Some of the newest systems actually come with liquid cooling systems similar to radiators in cars.

Cost of Connectivity and Maintenance
Estimates of monthly connectivity costs range from Rp.100,000 to Rp.400,000. Seventy percent of schools with Internet service pay for their access with grants from the Ministry of National Education/Ministry of Religious Affairs (MoNE/MoRA), with some additional support from parents, fundraisers, and existing school budgets.

Sources of Funding for Computers
The JSSs and NFEPs visited primarily used the following seven means of obtaining computers for their organizations:

1. ***School Operational Assistance Fund (BOS):*** Most of the schools and NFEPs visited reported using some BOS monies from the federal government to buy and maintain computers and cover the cost of consumables. It was clear from discussions that one of the reasons these schools and NFEPs use some of their BOS funds for computers is that parents and students expect it.
2. ***Money from Parents***: Nearly all of the schools and NFEPs also report that parents provide funds to buy and maintain computers. In some cases, money and pressure from parents are the reasons why schools first bought computers for student use.
3. ***School Fees***: All schools and NFEPs charge students some type of school fees, often a variety of fees for different school functions. Some schools and NFEPs use some of these funds to buy new equipment on an annual basis and cover maintenance costs.[18]
4. ***Special Fund Raising***: Some schools and NFEPs reported holding special fund-raising activities to collect money to buy and repair computer equipment. These activities include social events, sale of school booklets, lotteries, etc.
5. ***School-Company Partnerships***: One school reported that a partnership with a local cigarette factory provided money, some of which was used to buy the school's two computers.
6. ***Block Grants from MoNE:*** Some schools reported applying for receiving Block Grants from MoNE to buy computers. Not all schools are aware, however, that they can apply for funds for this purpose.
7. ***Special Foundation Grants:*** One school reported receiving a special foundation grant to buy 20 computers for its school lab. Discussions with the headmistress about this grant indicated that some of the funds received from the foundation were in the form of a loan that had to be repaid. However, since the school had not been able to complete these payments for maintenance and support, the foundation refused to provide additional support. At the time of the visit, only eight of these 20 computers were functioning.

Even though schools can use BOS funds or request Block Grants from MoNE to buy computer equipment, it appears they are unable to use these funds to cover the cost of Internet access. The diverse array of approaches schools and NFEPs used to get the funds needed to buy and maintain computer equipment reinforces their strong desire to integrate computers into their organizations and increase student access to computer technology.

[18] It is important to note that none of the schools or NFEPs reported having a specific line item in the school's or NFEP's budget for buying or maintaining computer technology for administrative or student use. These costs seem to be covered by add hoc budget allocations.

2.5. What is the existing capacity to use computers and other ICTs for educational purposes?

Using ICTs in Education

Staff in all of the institutions visited have a narrow view about the use of ICTs in education. This perspective limits the use of ICTs to simply teaching basic computer literacy and how to use Microsoft Office applications mostly as part of the formal *ICT Middle School Course*. There is a limited understanding of how to integrate the use of ICTs to improve teaching and learning in non-ICT subjects. There is also a lack of understanding about different pedagogical use of ICTs in education such as project-based learning. It is common to hear school officials talk about "integrating ICTs into education" and to read about efforts to integrate ICTs into education in Indonesia. Unfortunately, the concept of "integrating" is most commonly used to simply talk about introducing computer equipment to schools, not about enabling teachers in all subjects to use these tools to improve learning. DBE3's professional development module on *ICTs for Life, Learning and Work* is designed to help address this problem by enabling teachers to gain different perspectives on integrating ICTs across the curriculum. However, more than a single one-day workshop will be needed to help teachers integrate ICTs into their teaching practices.

Part of the reason for computers not being used to enhance the teaching and learning, especially in non-ICT subjects, is that teachers generally do not know how to use computers and have never seen them being used in such a manner. The curriculum for different subjects does not seem to discuss using ICTs to present content and to enhance active learning. Integrating suggestions for using different ICTs in the teaching of non-ICT subjects is an effective way to encourage teachers to move beyond conventional teacher centered instruction. It is important to also note that national exams can inhibit teachers' and students' interests in enhancing learning with ICTs since this may be seen as being a waste of time that could be better spent preparing for the exams. Another important reason why computer resources and other ICTs are not truly integrated into general education is teachers' relative lack of access to these resources. Over time, as access to computer resources in schools increases, it will become important to integrate these expensive investments across the curriculum or schools will not gain a sufficient ROI to justify purchasing these resources. It also appears that in-service and pre-service teacher training programs, the middle school curriculum, and the national exams severely inhibit integration of ICTs into different subjects across the school program.

Visits to Schools with Internet: During the field visits, only two of the schools provided students with some level of access to the Internet. One of these schools, a relatively wealthy government school (one of the *1,000 best schools in Indonesia*), had two large computer labs, with 20 computers per lab. One of these labs had one dial-up access point to the Internet that was shared via a LAN connecting all of the computers to form a network. This school provided Internet access so that it could offer the third year of the *ICT Middle School Course*, which includes instruction on using the Internet. Unfortunately, because one slow connection was divided among all 20 computers in the lab, none of the computers had sufficient bandwidth for any real use of the Internet. The other school that provided Internet access to students did so through a single computer in the small lab, with 12 computers that could be connected to a phone line via a fee-for-use Internet access plan.

ICT as a Curriculum Subject

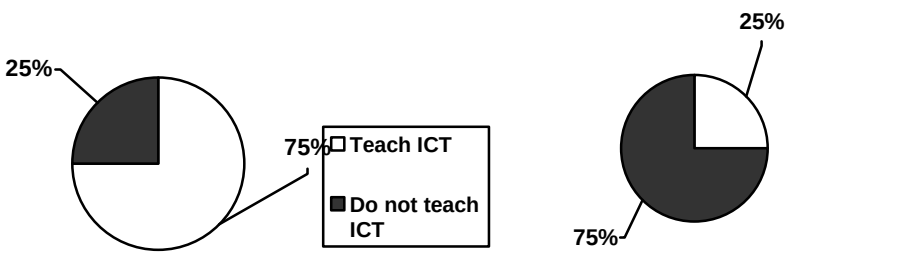
The *ICT Middle School Course* is an optional, three-year program that is taught two to four times a week depending on the school. The topics covered each year are:

- Year 1: benefits of ICT and its prospects, basic computer operation, types of software and hardware
- Year 2: introductory MS Word and introductory MS Excel
- Year 3: use of the Internet (taught primarily as theory because schools lack access to the Internet)

Field Visits: The principal at one school reported that his women teachers were more interested in learning to use computers than the men were. One English teacher at this school, a man, said he was not interested in learning to use computers because he did not have a computer at home.

The *ICT Middle School Course* focuses on teaching students how to use basic computer applications and does not include instruction in how to use computers as a tool for communication or to accomplish work. In addition, in learning how to use these basic computer applications students do not appear to create products representing real reports, letters, spreadsheets, presentations, etc. They only learned techniques, not how to use their "how to" skills to accomplish real work. This approach does not help students understand how computers can be used to improve learning or how companies, governments, and other organizations use computers to carry out their business. We observed that students are enthusiastic about learning to use computers, but this enthusiasm for learning is wasted on creating skills that are not used to develop useful capacity. These practices should eventually change, as the new 2006 curriculum now asks that students create a product based on what they have learned. However, simply requiring it in the curriculum will not cause teachers to make these activities a part of daily instruction. There are also indications that this is slowly changing as innovative young teachers bring fresh ideas into schools.

Graph 7: Percentage of Target Institutions Offering ICT Courses to Students



Notes on Graph 7: Only 58% of JSSs in the province of Sumatera Utara provide ICT courses to students, compared to 92% of JSSs in the province of Banten. For NFEPs, the proportion providing ICT training ranges from 18% for the province of Banten to a 42% in Jawa Barat.

Some of the target institutions without computers also offer the *ICT Middle School Course*, and there are generally more ICT teachers at JSSs than there are at NFEPs.[19] Most students taking *ICT Middle School Course* are organized in teams. Most districts also report offering ICT training as an extracurricular activity for an average of two hours per week.

Topics typically taught in the first year include:

- Beginning MS Word

[19] This does not say much about the student/teacher ratio.

- Typing
- Computer hardware

Topics typically taught in the second or third year include:

- Internet
- Beginning Excel
- Advanced Excel
- E-mail
- PowerPoint
- Frontpage
- Database

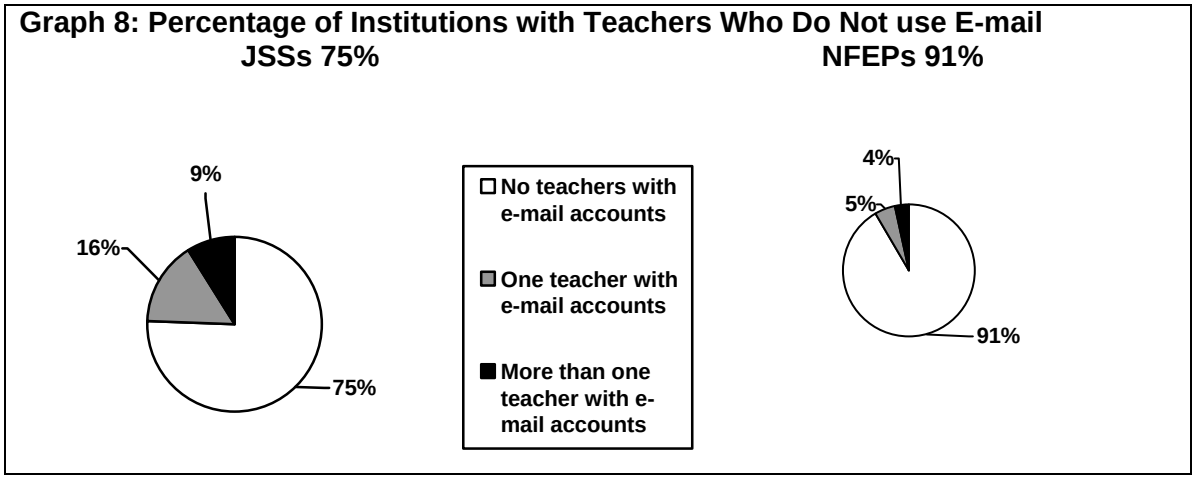
Teachers' ICT Skills

Only a few teachers in the schools and NFEPs interviewed during the field visits reported that they had basic ICT skills or that they wanted to learn to use computers. A small part of computer literacy for educators is core "how to" skills with the hardware, operating systems, basic applications (word processing), and introductory Internet skills. Most computer literacy training for teachers should focus, instead, on using technology to achieve educational objectives and effective pedagogical methods for integrating the use of computers into quality teaching and learning. Teachers will rapidly gain effective "how-to" skills as they learn to use computers to accomplish their educational goals. It is better to integrate computers into a variety of in-service and pre-service training activities rather than to isolate computer training in stand-alone workshops or training sessions.

Table 1: ICT Topics Taught By Year

Subject taught	Year taught	# FE	# NFE	Total
Computer Hardware	1	40	9	**49**
	2	5	2	7
	3	4		4
Beginning MS Word	1	60	21	**81**
	2	8	1	9
	3		1	1
Internet	1	3	1	4
	2	2	1	3
	3	31	2	**33**
FrontPage	2	2	1	3
	3	7	1	8
Beginning Excel	1	11	7	18
	2	45	11	**56**
	3	9	1	10
Typing	1	53	18	**71**
	2	12	2	14
	3		1	1
PowerPoint	1	3	2	5
	2	8		8
	3	14	5	**19**
Windows	1	31	8	**39**
	2	13	4	17
	3	2	3	5
Advanced Excel	1	1		1
	2	20	1	**21**
	3	14	7	**21**
Database	1	1		1
	2	1		1
	3	7	3	**10**
Advanced Word	1	2		2
	2	6	1	7
	3	6	1	7
E-mail	3	17	2	**19**
Visual Basic	1	1		1
	3	2	1	3

Graph 8: Percentage of Institutions with Teachers Who Do Not use E-mail



Notes on Graph 8: The lack of teachers with e-mail accounts can be an indicator of a lack of computer skills.

3. OPTIONS

Overview of Options

Opportunities and Options to Make a Critical Difference in Education with ICTs
Even though the use of ICTs, especially computer and Internet technologies, in education presents multiple challenges to DBE3 schools and NFEPs, it also offers some important opportunities to DBE3 (and other DBEs) in leveraging the power of ICTs to enhance education and improve school management. Some of the most promising options, based on discussions with DBE3 staff, are summarized below.

Brief Description of Each Option	***Characteristics and Appropriateness for JSSs vs. NFEPs***
INTEL Teach Program: The Intel Teach program focuses on formal education (K-12) targeted at teachers who use student-centered methods of instruction. Intel plans to launch the Teach program with two main components: *Getting Started* (the basic course) and *Essential Course* (a more advanced course). Intel will provide technical assistance and follow-up activities for the training of trainers. DBE3 would cover the cost of printing learning materials, the training venue, logistics, participant costs and site preparation. DBE3 would use this to fill the gaps between the ICT for Life, Learning, and Work modules and toolkits. Since Intel's *Getting Started* focuses on the basics of using computers, it would enable teachers to take full advantage of the DBE3 *ICT Toolkit*.	While the program focuses on formal education, this option can be used in conjunction with the *ICT for Life, Learning, and Work* module and *ICT Toolkit* and adapted to the specific needs of NFEPs.
ICT Toolkit for Better Education (DBE3 will implement this): This Toolkit (which is different from the toolkit for using ICTs in extracurricular programs) can be developed in collaboration with the other DBEs and Pustekom. This is actually a meta-activity that includes multiple integrated ICT activities.	Two slightly different versions of the toolkit could be developed for DBE3, one for formal schools and one for NFEPs.
Virtual Internet Kit: This kit, which might be developed in collaboration with Pustekom, would provide schools with a selection of educational web resources to be stored on their computers for students and teachers to use. This enables schools and NFEPs that do not have Internet access or those that have very slow access to provide their students and teachers with simulated Internet access.	This option does not require extensive capacity at the school level. It is equally appropriate for JSSs and NFEPs that already have computers. The content may need to be tailored to the specific curriculum of the JSSs and NFEPs.
Student Support Technicians: Develop and pilot a program to create Student Support Technical Clubs (SSTCs) at schools and NFEPs. SSTCs are an extracurricular activity that students join to gain practical skills in maintaining, troubleshooting and fixing basic computer problems. In the process of learning these skills, the	This activity is appropriate for any target institution that already has a computer lab or is

students in the SSTCs can help maintain the school's computer systems and gain important employability skills.	starting one.
Photography and Digital Imagery for Learning Develop and pilot a program to integrate the use of photography and digital imagery into teaching and learning in core DBE3 subjects.	This activity is appropriate for any target institution that has at least one computer.
Learning Materials Production: Develop a program to provide JSSs and NFEPs with the capacity to develop and produce their own instructional material to improve classroom teaching. This pilot uses both digital and analog technologies and employs equipment that does not require electricity.	This option does not necessarily require computers, so it may be appropriate as an ICT activity for all target institutions.
Pilot Alternative Computer Technologies: In partnership with Intel, develop a program to pilot the use of Intel's Community PC and/or the Classmate PC, in schools and NFEPs. The Community PC is a low-cost computer that is more durable and suitable for harsh conditions found in many Indonesian schools. This computer is also easier for schools to maintain than conventional desktops, and it should enable schools to use computers more effectively. This pilot may also include a solar technology power option, possibly in partnership with Boeing's Spectrolabs, for schools in remote areas with no access to electricity.	This option is a pilot. Criteria for site selection in remote areas need to be developed.

These seven opportunities are believed to offer the greatest immediate benefit to the majority of DBE3 schools and NFEPs at the lowest cost—that is, they have a high expected ROI while also being sustainable by schools and national and district-level organizations. Each opportunity has specific goals and objectives, target audiences, potential risks, costs, and opportunities for public-private partnerships. These seven options were selected from a longer list (see Appendix A) of possible initiatives.

When any type of ICT is considered for use in education, it is important that a careful assessment is carried out. Each of these possible options is presented within a proposed assessment framework. Another assessment framework for individual ICTs is presented in Appendix B.

3.1 Basic ICT Training for Teachers using Intel's Teach to the Future Program

Background and Rational: As described above, most staff and leadership at schools and NFEPs lack basic and intermediate computer and Internet "how-to-skills." A lack of these basic computer and Internet skills can be an impediment to making it possible for teachers to use ICTs to enhance the teaching and learning of their subjects. Unfortunately, many training programs focus on taking teachers through a series of abstract step-by-step instructional units, which are boring and have little application to their work as educators or school leaders. These basic skills may be a necessary condition to enabling schools to start using ICTs to improve education, but by themselves, these basic skills and training courses are **NOT** sufficient to enable effective and sustained integration of ICTs into education. The Intel Teach Program™

uses “how-to-skills” training and is done in an educational context where teachers use content from the courses they teach or real work as the focus of learning how to use computers.

Activity Overview: Intel’s *Getting Started Course*, which is the first module in Intel’s Teach Program™, is a proven training program that introduces educators to the basics of computing within the context of using ICTs in schools to bring 21st Century skills into classroom instruction while also encouraging student centered learning. It could be possible and affordable for DBE3 to accelerate opportunities to introduce and integrate the use of ICTs to improve teaching and learning in DBE3s target communities by partnering with Intel to pilot the *Bahasa* Indonesia localized version of the *Getting Started Course* that Intel has prepared (in collaboration with the Ministry of National Education) in a sample of target junior secondary schools and then roll out the *Getting Started Course* to a larger number of DBE3 schools and NFEPs. Such a training program would provide a solid foundation for other ICT activities that DBE3, the schools, and government agencies might carry out at schools and NFEPs. By providing a core group (and potentially all school teachers and leadership staff) with a strong set of basic computer skills through Intel’s *Getting Started Course,* DBE3 will likely catalyze local innovation and follow-on ICT in education activities led by teachers that will create opportunities for continuous use of ICTs in education.

Under this possible activity, DBE3 would build on Intel’s newly-developed and rapidly moving partnership with the MONE. The Ministry plans to roll out use of a translated and localized version of the *Getting Started Course* to senior secondary school starting in September. USAID has already signed a partnership agreement with Intel for DBE2 to pilot and scale up use of this version of the *Getting Started Course* in a sample of DBE2 primary school clusters, using Cluster Resource Centers as a training base. To simplify piloting, DBE3 would coordinate with the DBE2 pilot to the extent possible and use the same approach. DBE3 would identify target districts or sub-districts. As described in USAID’s Memorandum of Understanding with Intel, an Intel senior trainer would be appointed and funded by Intel in each province to conduct an initial training of Master Teachers. To ensure quality implementation of the course, it is likely that DBE3 would use Public Private Alliance (PPA) funds to fund the training of master trainers in collaboration with Intel staff, who will provide senior trainers and materials development. These trainers would then participate in existing DBE3 training activities to provide educators with a basic set of ICT skills. To encourage consistent quality of this cascade approach to training, DBE3 staff will collaborate with Intel parallel programmatic support to also provide follow-up and in-service support of educators who take the *Getting Started Course*.

It is all too common for teachers to be abandoned to their own devices after receiving intense short-term training with the expectation that they will have no difficulty applying what they have learned and change their teaching practice. As Intel and others involved in providing teachers any kind of training, especially basic ICT training, have learned, it takes much more than a single training experience to bring about changes in teaching practice and to create an environment where educators routinely make use of ICTs to enhance their teaching and student learning. A training course, no matter how well designed and carried out, is only one part of a complex process of change and professional development. Without some type of continuous follow-up or a school-based mechanism to continue the momentum started with the training, there will be little if any return on this investment in training. This will be especially important in Indonesia where there is a culture of only using a school’s computers, where they are present, to teach the *ICT Middle School Course*. In most DBE3 schools and NFEPs few if any non-IT teacher make use of computers to prepare learning materials, manage their classes, or to

enhance learning. Training is simply an input and should not become the end result; it is only a means to a much more important end—improving student learning.

Detailed Description:

- **Activity Goals and Objectives**
  - Carry out a training-of-trainers activity to prepare a cadre of skilled trainers who will then be able to provide basic ICTs in education training using Intel's *Getting Started Course*.
  - Train teachers in target schools using the *Getting Started Course* and develop an approach for follow-up support.
  - In collaboration with Intel, DBE3 will fund an outside evaluator to evaluate the training program in order to assess the impact and improve the training program for schools and NFEPs

- **Underlying Assumptions and Potential Risks**

  The success of this basic ICT in education training program depends on the following assumptions and requirements:
  - That Intel's training curriculum and approach is effectively adapted to meet the needs of the DBE3 program and participating schools and NFEPs. Even though these are related audiences, they have important differences and the *Getting Started Course* should be adapted to include learning exercises relevant to each audience. Learning new skills is always more effective when training is carried out within the context of the learner and is meaningful to their daily needs.
  - That target locations can be found or developed that meet the conditions laid out in USAID's MOU with Intel.
  - If schools do not have any or too few computers in working order for teachers to use, there will likely be no capacity for the teacher to apply their new skills when they return to the classroom. This can lead to frustration and a waste of the costly investment in training. As with many new skills, people quickly lose interest in this new capacity if they do not apply their skills in real-world situations soon after the training is complete. This "use it or lose it" problem is especially critical to the mix of ICT and pedagogical skills that would be provided through Intel's *Getting Started Course.* Intel and the DBE3 team therefore need to design the delivery of this training to match with the availability of sufficient working computers in schools.
  - As described above, it is also essential that some type of follow-up program be linked to this training activity to ensure that the new skills start to be applied within an enabling environment at schools. Without such a program, it is unlikely that the training experience alone will be able to overcome the momentum of the status quo and changes in teaching practice will not occur. This activity needs to focus more on achieving sustained improvements in teaching practices and student learning than on simply delivering training.
  - One important way to achieve these desired results is to involve school leadership in this training activity to both learn these basic ICT skills and how integrating ICTs into education can improve learning across all subjects and grades. DBE3 and Intel would collaborate on a one-day seminar for schools and officials in selected schools.

- **Necessary Conditions and Inputs**
  To implement this activity the following inputs will be needed:
  - Funds to cover the cost of DEB3 project staff and participant travel expenses for those who will participate in this activity (PPA line item or existing staff line items).
  - Funding the travel expenses of Master Trainers to deliver Intel's course effectively so that teachers will gain the capacity to use their new skills when they return to their schools as well as follow up programs (PPA line item).
  - Financial and staff commitment, in the form of programmatic support from Intel, to assist in developing the training program, delivering the training, providing follow-up support to educators who receive the training and to focus on achieving improvements in teaching practices and learning outcomes.
  - Funds to partly cover the material expense of adapting the training materials, evaluating the training and then to refine the training program so that it can be scaled up by other DBEs and local and national government agencies.
  - That staff and leaderships at the schools and NFEPs are also trained so that they support their teachers' efforts to apply what they learn from this course in their classes.

- **Staff/Skill Requirements and Level of Effort:** [Content for this section will be added if this activity is selected for implementation.]

- **Intended Outcomes and Results**
  - The principal intended outcome from this activity is for a large number of teachers and school leaders from DBE3 schools and NFEPs to gain basic ICT skills and an initial understanding of how to integrate the use of ICTs into education. It is also intended that the teachers and school leaders will apply these new skills in their work when they return to their schools.
  - This activity will also result in:
    - Developing an effective basic ICT in education training program by adapting Intel's *Getting Started Course* that will meet the needs of teachers in formal schools and NFEPs;
    - Developing a cadre of skilled trainers who can enable effective teacher learning that will result in changes in teaching practice and improvements in student learning; and
    - Developing an effective follow-up activity that will enable teachers to practice their new skills and understandings in their schools and to make the use of ICTs in education a routine part of their educational program.

- **PPA Opportunities and Requirements**
  This activity is based on a PPA between Intel and USAID.

- **Estimated Budget:**
  An estimated budget for carrying out this activity would need to be done in partnership with Intel once a decision is made to implement this activity.

- **Estimated Timeframe**
  Developing and delivering this training program and follow-up activity would involve the following main activities:

- Finalizing agreements with Intel about the nature and extent of their contributions.
- Identifying the people who would participate in the training and become Master Trainers and Participant Trainers.
- Designing effective strategies for providing follow-up and support to teachers so that this training results in teachers using these new skills and a change in teaching practice.
- Work with Intel in designing an assessment strategy to evaluate the results and impact of this training program over time.
- Delivery of the ToT and preparation of a training schedule for delivering end-user training.
- Delivery of the end-user training with roving master trainers to ensure that the quality of this training is maintained.
- Implementing the follow-up activity to ensure that teachers make use of these new skills.
- Assess the effectiveness of different aspects of this training program and refine the training package so that it will be more effective and can be scaled up.
- Prepare a final report about this training and PPA activity.

3.2 ICT Toolkit for Better Education

Background and Rationale

As described above, the staff and leadership at schools and NFEPs lack critical knowledge about and skills in buying, maintaining, and using computers and Internet technologies in their schools. They also have little or no access to printed information and digital resources to help them make informed decisions about buying and using ICTs in their schools. This results in poor decisions about what equipment to buy and how to use these resources to deliver the best possible educational benefits. To address this problem, DBE3, in partnership with the other DBEs, could develop a Toolkit comprised of easy-to-use information and resources for providing or increasing access to ICTs and for using these resources to deliver quality educational benefit.

Activity Overview

The *ICT Toolkit for Better Education* activity creates both physical and digital versions of a Toolkit that includes a mix of information, tip sheets, and learning materials designed to help school and NFEP administrators and teachers plan, implement, and use ICT resources to improve school management, teaching, and learning. The Toolkit is a low–cost, rapid way to help schools and NFEPs improve the ROI from their ICT investments.

The following is a list of possible content that might be included in this Toolkit.

- Tips on how to form and manage a school-community ICT committee
- Tips on how to create an ICT business and education plan
- Tips on how to create and maintain public-private partnerships between schools and local businesses to support the development and use of ICTs in education
- Tips to keep ICT resources working at schools—for example, “The Care and Feeding of ICTs in Schools”
- Important things schools should know before investing in computer equipment

- Basic features and specification for computers and other ICT for use in schools and NFEPs
- Tips on creating affordable an effective *ICT Learning Environment* in schools
- Tips on improving school management using ICTs
- Tips on preparing proposals for block grants to implement ICT plans in schools and NFEPs
- One or more CD-ROMs with a selection of free and open source software for education, training, ICT management, etc.
- Self-managed learning module on implementing project-based and active learning using ICTs
- Tips on how to set up and run revenue-earning ICT facilities in schools using the schools' computer facilities
- Strategies for getting access to the Internet
- Tips on how to use Internet access to improve teaching and learning
- Tips for setting up and managing an affordable and easy-to-use LAN in schools and NFEPs
- Configuring one computer in a school computer lab to function as a server
- Creating a school intranet to simulate the Internet and increase educational value
- A CD-ROM library comprised of educational web sites for use on schools' intranets
- A CD-ROM of Digital Reference Library (e.g., Wikipedia) and other learning materials
- CD-ROM resources for "how to" training/learning (ICT-Center, Unlimited Potential, Partners in Learning [PiL], Intel Teach to the Future, etc.)

The Toolkit can be structured to include a set of brief laminated "Tip Sheets," along with a binder with more detailed information for each Tip Sheet. Principals and teachers can use the Tip Sheets to start an activity then refer to the detailed information in the binder as needed. The binder makes it possible for the Toolkit to be updated easily and enhanced over time.

Detailed Description

- **Activity Goals and Objectives**
  - The ICT Toolkit will provide the staff and leadership of schools and NFEPs with easy-to-use and -understand information to assist them in making good decisions about buying ICTs for their schools and in gaining the greatest educational benefit from these expensive investments.
  - The Toolkit will provide a selection of quality educational resources that can be adapted and duplicated to enhance teaching and learning with technology.
  - The Toolkit will enable schools and NFEPs to optimize their use of ICTs and to derive the greatest level of benefit possible from these resources.
  - The Toolkit will help build the capacity of local organizations to develop and maintain these types educational resources.

- **Different Aspects of the ICT Toolkit Activity Targeted Toward Four Audience Groups**
  - Material developers at Pustekom who might partner with DBE3 to develop the Toolkit and learn how to create useful materials and to improve the Toolkit over time.
  - Principals at schools and NFEPs who might use some of the Toolkit materials to improve systems for managing ICTs in their schools.

- Teachers of all subjects, especially the core DBE3 subjects, who might use the Toolkit to integrate the use of computers into routine teaching and learning. The ICT teachers might use the Toolkits to improve the maintenance and utility of the school's computers.
- Students at the schools and NFEPs might be the ultimate target audience. Students might benefit from more effective use of computer resources and integration of ICTs into different subjects.

- **Underlying Assumptions and Potential Risks**
  The success of the ICT Toolkit depends on the following assumptions:
  - Pustekom agrees to partner with DBE3 to co-develop these materials and covers most or all of the production costs to publish enough Toolkits for all DBE3 schools and NFEPs.
  - Pustekom agrees to participate in a training effort carried out by DBE3 staff to build the capacity of their staff to develop Toolkit resources.
  - The DBE3 project allocates funding to enable project staff to work with Pustekom staff to develop, test, refine, publish, and distribute Toolkit resources.
  - DBE1 and DBE2 agree to collaborate with DBE3 in creating resources for the Toolkit related to their focus activities.
  - The staff and leadership of schools and NFEPs use the Toolkit's resources.

- **Necessary Conditions and Inputs**
  To implement this activity the following inputs are needed:
  - Funds to cover the cost of project staff time.
  - Hiring staff and consultants with the skills needed to design, develop, test, and refine core Toolkit resources.
  - Funds to cover part of the material expense of designing, testing, refining, and publishing Toolkit materials and resources.
  - Staff and leadership at the schools and NFEPs are trained to use the Toolkit's resources.

- **Staff/Skill Requirements and Level of Effort**
  [Content for this section will be added if this activity is selected for implementation.]

- **Intended Outcomes and Results**
  - The principal intended outcome of this activity is a Toolkit comprised of some of the components described above.
  - Use of the Toolkit in schools and NFEPs is expected to result in:
    - improved decision making about buying and using ICTs in schools;
    - more effective management of ICT resources;
    - better-maintained equipment;
    - a larger selection of software available for students and teachers to use; and
    - improved use of existing and future ICT resources and an increase in the educational ROI from these resources.

- **Public Private Alliance (PPA) Opportunities and Requirements**
  - The principal partnership opportunity possible via this activity is with Pustekom.

- Partnerships with other companies, including Microsoft, OpenLab, Intel, HP, etc., may be possible with respect to providing access to information and learning resources that might become part of the Toolkit.

- **Estimated Budget and Match**
  - An estimated budget for the production of the ICT Toolkit would be prepared once the decision is made to implement this activity.
  - This activity will generate a match in terms of the value of time and resources contributed by Pustekom and the value of contributions made by other partners.

- **Estimated Time Frame**

  Developing the Toolkit will involve the following main activities:
  - Establish the partnership with Pustekom to develop the Toolkit.
  - Identify the principal resources and information topics that should be included in the first version of the Toolkit.
  - Identify other possible partners that could provide and take responsibility for information topics and specific resources for the Toolkit.
  - Design and develop the initial drafts of each Toolkit component.
  - Test and evaluate draft versions of Toolkit components with principals and teachers at DBE3 schools and NFEPs.
  - Refine Toolkit components and prepare final version of the Toolkit.
  - Pilot the Toolkit with a selection of schools and NFEPs and evaluate the results.
  - Finalize the Toolkit and produce a sufficient number for distribution to all DBE3 schools and NFEPs.
  - After a year of use, evaluate the impact of the Toolkits on the use of ICTs in schools and NFEPs.
  - Prepare a report about the Toolkit.

Development of the Toolkit will likely take three to six months. Then, after a year of use, there will be a final evaluation before additional Toolkits are produced for other DBE3 schools and NFEPs.

3.3 Virtual Internet Kit

Background and Rationale

Most schools and NFEPs cannot afford to provide students and teachers with any level of access to the Internet. In addition, the few schools that have been able to provide Internet access are limited to offering a single, low-bandwidth, dial-up access that is only available at one computer or is shared across the computer lab's network. As a result, no students and few teachers ever get a chance to use the Internet for educational purposes. This problem is especially critical for those schools offering the ICT curriculum, since the third year of this subject requires students to learn to use the Internet. Plans are under development that promise to bring affordable, high-speed Internet access to most schools. Unfortunately, it may take several years before schools start to benefit from these projects and many schools and NFEPs will not be able to take advantage of these services. It is possible to provide students and teachers with access to educational web sites that can be used to enrich many aspects of teaching and learning while also making it possible to learn how to use browser software and

many Internet resources. As most educational web materials are in English, this activity would be most suitable in combination with English language learning.

Activity Overview

This activity will create a CD-ROM and DVD collection of high-quality educational web sites—the Virtual Internet Kit (VIK)—that will be installed on individual desktops at schools and NFEPs or a computer lab's server for students and teachers to use. Students and teachers can access and navigate these stored web sites using Internet browser software in exactly the same way as they would use the Internet through a live Internet connection. Since only a relatively small collection of web sites will be captured and stored locally, not all of the hyperlinks in the stored sites will be active. In addition, users will not be able to send and receive e-mail or use other communication features. Most dynamic content also will not function on the stored web sites. If schools have some level of access to the live Internet, then they can limit the use of this connection for communication functions or to access news or other web sites with dynamic content. This activity can also include a teachers' guide to help teachers use this resource and integrate it into their different subjects. At the same time, teachers and students can be encouraged to take copies of this resource home to use on their home computers.

Detailed Description

- **Activity Goals and Objectives:** The principal goal of this activity is to provide all DBE3 schools and NFEPs with access to a selection of quality Internet-based educational resources quickly and inexpensively without the need for a live connection to the Internet. This is especially important for schools and NFEPs that are resource poor or that have no telecommunication capacity and thus have no other options for providing their students and teachers with some level of access to Internet resources.

- **Target Audience(s):** The principal target audiences for this activity are the teachers and students at DBE3 schools and NFEPs. However, once this collection of web sites is copied from the Internet, organized, indexed, and interlinked, the collection can duplicated easily and inexpensively for distribution by Pustekom to schools across Indonesia.

- **Underlying Assumptions and Potential Risks:** The success of the VIK activity depends on the following assumptions:
  - Even though this activity can be done without Pustekom, it will likely be much more successful if DBE3 collaborates with Pustekom. A partnership with Pustekom is especially important for duplicating the collection of web sites that comprise the VIK. In addition, a partnership with Pustekom is critical to periodically updating the collection of sites and distributing the revised collection to schools and NFEPs.
  - The DBE3 project also needs to allocate funding for staff and consulting time to develop the VIK.
  - To be useful, the initial version of the VIK needs to contain between 20 and 50 web sites, and a majority of these need to be in Indonesian. Some English-language sites can be included as resources for teaching English. Over time, additional web sites can be added to the collection.

- **Necessary Conditions and Inputs:** Creating the VIK requires few inputs other than staff and consulting time. A few needed inputs include:

- Software to copy web sites from the Internet and configure them for offline browsing.
- Some consulting time to hire a programmer to create a shell within which the captured sites reside so they can be updated, indexed and searched automatically.
- A large number of blank CDs and DVDs so the collection of web sites can be distributed to schools. The number of CDs and DVDs needed depends on the number and size of the sites collected and how often the collection is updated and enlarged.
- Some facility to duplicate large numbers of CDs and DVDs for distribution to all DBE3 schools and NFEPs that have computers.
- Staff at Pustekom need to understand existing educational web sites and the kind of educational and reference materials that middle school teachers and students and NFEP staff and students need and want to enhance teaching and learning.
- Between 10 and 50 education and reference web sites in Indonesian, for use by students and/or teachers, are needed to make this activity useful.
- To be most useful for teaching, the teachers should receive suggested lessons and ideas for integrating use of this resource into different subjects across the curriculum. The teachers' guide for this offline Internet resource should also include an overview of all content available so teachers can plan their lessons more easily.
- The offline simulated Internet educational resource needs to be updated at least once every three months to keep it fresh and useful. To do this, some mechanism for distributing updates by CD-ROM or via online downloads need to be implemented.

- **Staff/Skill Requirements and Level of Effort:** [Content for this section will be added if this activity is selected for implementation.]

- **Intended Outcomes and Results:**
  - The principal intended outcome of this activity is that schools and NFEPs that have slow or no access to the Internet are able to provide their students and teachers with a selection of educational web sites via their existing computers.
  - The presence of the simulated Internet also makes it possible for teachers and students to learn basic skills in using the Internet and browser software. This helps prepare teachers and students for live access to the Internet when it becomes available.
  - For schools or NFEPs with at least dial-up Internet access, this effort enables these schools to optimize this resource for communication functions, while browsing can primarily use the offline Internet content.
  - Having a set of pre-selected educational content from the Internet on school computers enables teachers to plan to use and integrate this content into routine teaching since they would know ahead of time what content is available to students.

- **PPA Opportunities and Requirements:**
  - The principal partnership enabled via this activity is with Pustekom. This partnership is essential to achieve some level of sustainability for this activity.

- It may be possible to find one or more private companies willing to partner with this activity and become its sponsor. Such a partner (or partners) might be able to place their logo and name on the CDs used to distribute the VIK and to have an opening screen dedicated to their partnership that is visible when students and teachers start this resource.
- It may also be possible for the project to partner with the authors and/or sponsors of the web sites "featured" in the VIK.

- **Estimated Budget and Match:** [Content for this section will be added if this activity is selected for implementation.]

- **Estimated Time Frame:**
  - It will take three to four months to prepare the first version of the VIK for distribution to a selection of DBE3 schools and NFEPs for testing.
  - After a two-month evaluation of the VIK by teachers and students, the Kit will be improved, and a final first version can be prepared for distribution to schools. This last step will likely take one month.
  - Distribution and Installation of the VIK at all DBE3 schools and NFEPs that have computer systems will likely take another month.
  - From the start, and based on user input, Pustekom needs to start working on version 2 with more sites and updates, which can then be distributed to the schools and NFEPs three months after the first version is installed. Supplements and updates to the VIK teachers' guides also need to be distributed (once every 1 to 3 months) to encourage teachers to use this resource.
  - It may also be useful for the schools and NFEPs to make it possible for teachers and students to take copies of the VIK home for use on their home computers.

3.4 Student Support Technicians

Background and Rationale: One of the biggest problems schools and NFEPs face in using computers is maintaining the equipment. At the same time, to increase the ROI from computer systems in schools and NFEPs, this expensive equipment must be used in more and creative ways to achieve educational benefit. It is also important for schools and NFEPs to find ways to improve their students' employability skills. All three of these objectives can be achieved through the Student Support Technicians (SST) activity.

Activity Overview: It is recommended that the SST activity be piloted in four to eight schools and NFEPs before being scaled up in other DBE3 schools and NFEPs. Teams of students and one or two faculty advisors, organized to form an SST Club, receive basic computer technical support training. SST Club members then provide basic technical support for the schools' or NFEPs' computers. This helps students gain valuable technical, employability, and life skills. By using peer learning, the SST program can be a self-sustaining activity.

Detailed Description: The pilot activity can include the following elements:

- *SST Training Curriculum*: DBE3 staff organize a team of volunteers from vocational high schools, IT companies, and government programs to create a self-managed technical support training curriculum that used to prepare members of the SST teams or clubs to

learn the skills they need to provide technical support to their school's or NFEP's computer systems.

- *SST Learning Resources:* DBE3 also works with Microsoft's Partners in Learning (PiL) program to adapt the technical support training CD for use in Indonesia. This is a learning resource to help prepare students to be effective school-based support technicians.
- *SST Faculty Advisors:* The DBE3 SST team recruits at least one (but two is preferred) teachers in each school or NFEP selected for this pilot to serve as SST faculty advisors and help create the SST team or club in the schools. These "faculty advisors" provide guidance to the youth, help organize logistics for providing effective SST services, and serve as the SST champion within the school. These SST advisors attend an orientation session to help them learn how to play their role successfully. In addition, a listserv is established for the SST advisors from different schools so they can help each other fill their role successfully and learn from each group's experiences.
- *SST Teams or Clubs:* The DBE3 SST team (staff and volunteers) work with each of the schools and NFEPs selected for this pilot to create SST teams comprising 10 to 15 students from the upper grades. This becomes one of the extracurricular activities offered by schools or NFEPs.
- *SST Training:* At the start of the SST Club, the volunteer teams hold a training workshop for members of school and NFEP SST teams. These workshops can be organized at each school or NFEP participating in the pilot, or representatives (advisors and two to four students) from each SST Club can attend a district-level SST training program. Once completed, these representatives return to their schools or NFEPs to train the rest of the members of the SST Club.
- *Sustaining the SST Activity:* Toward the end of the first year of SST Club activity, the teams recruit younger members to replace those who are graduating. The senior team of SST members trains these new recruits, who also work alongside the more senior members to learn how to provide effective technical support services at the school or NFEP. This peer learning program can lower the cost of continuing and expanding the SST Club program and help create a self-sustaining initiative. In addition, the process of peer training and learning strengthens the older students' technical support skills.
- *SST Certification:* When SST Club members graduate from their school or NFEP they also receive an SST Certificate of Achievement from the DBE3 and core IT company partners.
- *Daily Technical Support:* Students who are part of SST Clubs are allowed some time out of classes to help teachers who want to use school computers to enhance teaching and leaning. SST Club members are the school's or NFEP's first line of defense for solving and preventing computer technical support problems. If they find problems they cannot solve, the school or NFEP is better equipped to deal with outside service providers.
- *Supporting the SST Activity:* It may be possible to link the SST Club program to a district-level school technical support program or to a national help desk service such as what Microsoft provides in many countries.
- *Monitoring and Evaluation:* During the first year of SST Club activities, DBE3 staff monitor the activity to learn how it is being carried out. The activity is evaluated at the end of the first year to extract lessons and to determine if this activity should be continued and scaled up across all DBE3 schools and NFEPs.
- *Extending the SST Activity:* For schools and/or NFEPs located near district and sub-district education offices or DBE1 cluster resource centers, the SST Clubs at these locations may be able to help provide technical support services. If this happens, the

Goals and Objectives: The SST Club activity is designed to achieve the following main goals and activities:

- SST Club provides students with quality technical, employability, and life skills.
- This activity also provides schools and NFEPs with sustainable and reliable means to support and maintain their computer resources.
- The availability of quality technical support at schools and NFEPs is likely to encourage teachers to use their schools' ICT resources to enhance teaching and learning.

Target Audience(s): SST Club activity is targeted at students at middle schools and NFEPs as well as the leadership and staff of these institutions.

Underlying Assumptions and Potential Risks: The success of the SST Club activity depends on the following:

- Ability to recruit schools/NFEPs and SST faculty advisors to participate
- Ability to recruit private sector partners and sponsors to provide staff to develop the curriculum, train SST participants, and provide periodic ongoing support and advice
- Ability to convince schools and NFEPs to adopt flexible policies that allow student participants to provide support services to the school's computer systems and teachers who wish to integrate ICTs into their daily teaching
- Allocation of funds from DBE3 to implement this activity
- Ability to sustain SST Clubs and keep the faculty advisors and students actively involved in pilot activities
- Carrying out a well-designed yet simple monitoring and evaluation program within this activity
- Ability of the peer-training program to prepare the next group of SST students

Necessary Conditions and Inputs:

- The SST pilot activity has a much better chance of success if DBE3 is able to partner with one or more IT companies to co-sponsor this activity by providing volunteers to help develop the curriculum, training the first group of teachers and students, and providing ongoing support.
- Funding from DBE3 and one or more private sector partners is required.
- Capacity to provide the SST clubs with ongoing technical support via a web site and a telephone support system is also needed.

Staff/Skill Requirements and Level of Effort [Content for this section will be added if this activity is selected for implementation.]

Intended Outcomes and Results: Two principal outcomes are expected from this activity:

- Provide schools and NFEPs with in-house basic technical support for their computer systems.
- Provide students who participate with basic technical, employability, and life skills.
- This activity is also expected to enable teachers in the participating schools and NFEPs to make more effective use of their computer resources to improve teaching and learning.

PPA Opportunities and Requirements:

- The SST activity has the potential of attracting one or more companies, such as Microsoft and HP, to sponsor and provide staff to help develop the SST curriculum and assist with training and ongoing support.
- It may also be possible to orchestrate partnerships with local companies in the cities where the participating schools are located.
- A telecom company may also want to partner to provide free phone time for ongoing telephone support for SST youth.

Estimated Budget and Match: [Content for this section will be added if this activity is selected for implementation.]

Estimated Time Frame: The following key tasks are needed to implement this activity:

- Task 1: Prepare the DBE3 team and volunteers, and recruit the schools and NFEPs (including the faculty advisors and student participants) that will participate in the pilot phase of this activity—2 months.
- Task 2: Prepare the SST Club training curriculum and carry out the training workshops—2 months (overlaps with the last month of task 1).
- Task 3: Prepare monitoring and evaluation materials and methods—2 weeks (overlaps with the last month of Task 2).
- Task 4: Launch the SST Club activity and initiate school/NFEP-based pilot activities—6 to 9 months (activity monitoring occurs during this period).
- Task 5: Prepare certificates, organize peer learning with new SST student participants, and hold "graduation" ceremony for senior SST students—1 month.
- Task 6: Evaluate SST Club activity, prepare a report on the pilot, and present results at a DBE3 Periodic Seminar.

3.5 Photography and Digital Imagery for Learning

Background and Rationale

A picture tells a thousand words! Learning is most successful and resilient when it involves a mix of human senses, including some combination of images, words (spoken and read), sounds, touch, smell, taste, and physical and psychological experiences.

In a small project in India, teachers asked for help in developing learning materials that included images and diagrams to enable them to help their students learn about topics and concepts that were difficult or nearly impossible to explain. This includes concepts related to the environment, conservation, pollution, how planes fly, and how a letter travels from the mailbox to the recipient. In response to this request, AED worked with teachers and a local company to create a CD-ROM learning environment that presented this and much more information using a mix of sounds, text, audio descriptions, diagrams, photographs, and simple animation. The impact of this resource was exceptional. Even though the school had only a few computers, teachers reported that students learned previously difficult concepts quickly and retained the knowledge longer. Teachers also reported that students quickly found ways to apply their new knowledge and were much more active and assertive learners. Learning in the absence of mixed sensory input is dry and lacks impact or resilience. Unfortunately, much of the learning in schools in Indonesia involves only lecturing and text written on the blackboard.

Detailed Description

- **Activity Goals and Objectives:** The principal goal of this pilot intervention is to improve teaching and learning through more effective use of images, diagrams, and pictures. This goal embodies the following objectives:
  - building teachers' pedagogical and technical capacity to create and integrate visual material into their teaching and learning materials, and
  - building the physical capacity of schools to create visually interactive learning materials (paper-based and digital).

- **Target Audience(s):** This pilot activity targets teachers in schools and NFEPs; students are the primary beneficiaries.

- **Underlying Assumptions and Potential Risks:** As with all of the interventions suggested in this report, this pilot is more complex than it may appear at first. The assumptions described in the Learning Materials Production activity below are the same as those for this pilot.

- **Necessary Conditions and Inputs:** For this activity to succeed, the following conditions and inputs are required:
  - An equipment kit comprising some combination of the following items, depending on the final design of the activity: 1) digital and/or film cameras (and supplies); 2) computers and software to image, manipulate, and print the images and to create CD-ROM-based learning materials; 3) color printers (paper and ink) to produce physical pictures and learning materials that incorporate the images; and 4) LCD projector(s) to present learning materials (PowerPoint) in classrooms.
  - To duplicate content created with the above equipment, the project may also need access to some form of equipment such as that described in the Learning Materials Projection activity below.
  - To use film cameras, the schools or NFEPs participating in this activity need easy access to shops that develop and print pictures, along with funds to cover this cost.
  - If the pilot is designed to enable students to use cameras and production technologies so they can use photography to enhance teaching and learning then a sufficient number of cameras (digital and/or film) with accessories and funds for consumables are needed.
  - If this pilot is intended to provide students with an introductory course (for NFEPs or extracurricular activities) in graphics and photography, then enough additional equipment kits are needed to enable teams of two to four students to use each kit.
  - The pilot needs to create two main training programs, one to prepare teachers to use the technology and integrate the use of images in education, and another to prepare teachers, students, and school/NFEP administration in management and maintenance of this equipment and resources.
  - DBE3 needs to allocate funding and staff time to make this pilot project possible; if funds are limited, it is essential to orchestrate PPAs to cover any shortfall in funding.

- **Staff/Skill Requirements and Level of Effort:** [Content for this section will be added if this activity is selected for implementation.]

- **Intended Outcomes and Results:** The primary intended outcome of this pilot is improvement of teaching and learning as teachers in the pilot schools and NFEPs start creating and integrating images, diagrams, and photos into their learning materials. This overarching outcome includes the following intermediate results:
    - Teachers will have the skills and abilities to develop visually stimulating learning materials to help students learn complex concepts and topics more quickly.
    - Teachers will also be able to integrate the use of photography and digital image production into their teaching by enabling students to use these tools in learning projects.

This pilot can also be enhanced in one or more NFEPs so students actually study a simplified form of graphic design that can lead to better job opportunities.

- **PPA Opportunities and Requirements:** This pilot activity offers a variety of opportunities for developing PPAs at local, national, and international levels.
    - At the local level, schools and NFEPs can develop PPAs with local photo shops to offer teachers and students discounts on developing photographs.
    - It may also be possible for schools and NFEP to partner with local companies to provide access, on a fee-for-use basis, to equipment purchased to carry out this pilot. Revenue generated through these relationships can cover the cost of consumables for student and teacher use of these resources.
    - At the national level, DBE3 and the schools and NFEPs can partner with Pustekom, with Pustekom creating CD-ROMs containing stock photos from different parts of Indonesia, diagrams for different subjects, and clip art to illustrate learning materials.
    - At the multinational level, the project may be able to partner with one of the major IT companies that specializes in digital image and printing technologies (Canon, Sony, HP, etc.) to provide equipment and resources to the schools at lower-than-market prices.

- **Estimated Budget and Match:** [Content for this section will be added if this activity is selected for implementation.]

- **Estimated Time Frame:** As with the other pilots, this activity is likely to require about one year to plan, prepare, carry out, and evaluate. Important tasks that need to be carried out include:
    - Task 1: Prepare a detailed design for the pilot and determine what equipment is needed—2 weeks.
    - Task 2: Identify and select a mix of six to eight schools and NFEPs to participate in the pilot and develop and sign the collaborative agreements prepare the monitoring and evaluation plan for the pilot; and collect the baseline data for monitoring and evaluation—1.5 month.
    - Task 3: Develop PPAs for this pilot, and, based on the nature and extent of the PPAs, purchase the remaining equipment needed. The number of participating schools and/or NFEPs may need to be adjusted depending on the extent of the PPAs and the cost of the equipment kits—1.5 months (parallels Task 2).
    - Task 4: Acquire the needed equipment kits and develop the training module to prepare staff and teachers at the schools and NFEPs to use the equipment,

manipulate images, prepare learning materials, and integrate the use of images and photography into teaching and learning—2 months.
- Task 5: Deliver the equipment to the schools and NFEPs and carry out the training—2 months.
- Task 5: Carry out the pilot and follow-up with monitoring activities—6 to 9 months.
- Task 6: Carry out the evaluation, write the report, and hold a workshop to present the results—2 months.

3.6 Learning Materials Production

Background and Rationale

None of the schools or NFEPs visited has the capacity to produce and publish paper-based learning materials for use with students for several apparent reasons. First, the schools lack the funds to pay for photocopying services. Second, they lack production and duplication equipment. When asked about the lack of duplication equipment, school staff commented that photocopiers are too expensive to buy, maintain, and use. They also mentioned that photocopies, when needed, are easily available from local shops. It appears that school staff are unaware of any alternative, lower-cost, mechanisms for duplicating printed material used in schools. Teachers also lack the skills to create learning materials that can be duplicated, and schools and NFEPs apparently do not recognize the value of providing students with locally produced, paper-based exercises, reading materials, etc.[20] The lack of an affordable way for schools and NFEPs to create and duplicate paper-based learning materials inhibits the capacity of these schools to deliver quality education.

Activity Overview

This activity pilots the use of a mix of digital and analog technologies to provide schools and NFEPs with the capacity to develop, publish, and distribute affordable paper-based learning materials and digital educational content that can be shared online and via CD-ROMs with other teachers and schools. Computers and training enable teachers and their students to design and develop creative learning materials for different media. Stencil and ink duplicators can be used to enable schools to print material affordably. These duplicators can duplicate content on almost any kind of paper, even the cheapest newsprint. The stencils can be reused many times, and the ink is less costly than laser toner. The duplicators can use electricity or can be powered by a hand crank. Maintaining these systems is also less complex and less expensive than are photocopies. Appendix C provides a short description of these duplicators.

Detailed Description

- **Activity Goals and Objectives:** The principal goal of this activity is to enable schools and NFEPs to create and duplicate paper-based and digital educational learning materials to enhance and enrich teaching and learning. As part of this goal, this pilot includes the following specific objectives:
  - Build and strengthen the capacity of teachers to design and develop (with their students) creative learning materials.

[20] In one of the schools, the ICT teacher had created and printed a small booklet on how to use MS Word and MS Excel. The booklets, which cost students about each, also included advertising from local companies. It is possible that this undertaking earned the teacher and/or school a small amount of revenue.

- Identify partner schools and NFEPs to participate in this pilot and develop collaborative agreements with them that specify each partner's responsibilities and roles.
- Outfit the schools with a mix of computer technologies (even schools without electricity from the national grid) and stencil and ink duplicators.
- Explore opportunities for PPAs to support continued use of this pilot.
- Create a network among schools and NFEPs participating in this pilot to share and exchange learning materials created by staff to enhance teaching.
- Monitor and evaluate this activity to determine if it can be scaled-up for use across all DBE3 schools and NFEPs.

- **Target Audience(s):** This pilot activity is targeted primarily to the teachers at select DBE3 schools and NFEPs; students are the principal beneficiaries of this pilot since they can benefit from better-quality learning opportunities.

- **Underlying Assumptions and Potential Risks:** The success of this activity depends on the following:
  - DBE3 allocates staff and funding to plan and carry out the different parts of this activity.
  - A selection of schools and NFEPs agrees to participate and share responsibilities. It is especially important that school/NFEP leaderships strongly support this pilot and agree to review school policies and procedures to help make this effort successful.
  - Teachers are open to learning to develop and produce learning materials and to using the technologies to continually create materials and share their content with other educators. Changing educators' behavior and routine practices is not easy, and maintaining new behaviors and practices is even more challenging. Actively participating in this pilot will take more teacher time and effort, while salaries will not increase. With time, educational performance should improve, but this may be an insufficient gain to impel teachers to adopt this new capacity.[21] Much more than new policies and dictates from leadership or outsiders is needed to overcome this challenge; behavior change principles need to be applied creatively.
  - Because of the apparent scarcity of stencil and ink duplicators in Indonesia, it may be difficult to find firms to provide supplies and routine maintenance for this technology. If this is the case, DBE3 may need to train staff at the schools and NFEPs to maintain this equipment. The schools and NFEPs may also need to work with local companies to have access to a reliable supply of stencils, inks, and cleaning fluids for the duplicators.
  - Stencil and ink duplicators are not considered to be "modern" technologies, and some schools and NFEPs may be reluctant to participate in this effort because they may feel they will not be perceived as modern schools.
  - Changing the educational culture of not providing paper-based learning materials (primarily because of cost) may be very difficult.

[21] This assumption and risk applies to all suggested interventions and pilots. It is also important to note that the difficulty in changing behavior and practices is not restricted to educators.

- **Necessary Conditions and Inputs:** In addition to having access to funds to buy needed equipment and staff time to manage the pilot, develop training materials and carry out the training, the following conditions and inputs are needed for this pilot to be successful:
    - For schools and NFEPs without reliable access to electricity, some other source of electricity is required, such as solar, to power the computer and printer needed to create the content to be duplicated. In addition, if the pilot included an electric stencil cutter, that needs electricity as well; the duplicator itself can operate on electricity or hand power. To address this concern, it may be possible to consider testing three different versions of the pilot:
        - Version 1—only a hand-powered duplicator, stencils are produced by hand or with a manual typewriter
        - Version 2—a hand-powered duplicator with a computer and dot matrix/daisywheel printer to produce the stencils
        - Version 3—an electric/hand-powered duplicator, a computer and any kind of printer, and an electric stencil cutter to produce the stencils from the printed documents
    - As mentioned above, one critical input is access to a supply of stencils, ink, and paper to produce paper-based materials. For digital materials, access to a supply of CD-ROMs and the Internet enables sharing of digital copies of learning materials.
    - Effective school leadership is essential (as it is in all interventions) to ensure that the equipment is used, that there are funds to purchase necessary inputs, especially paper, and that the system is maintained and operational.

- **Staff/Skill Requirements and Level of Effort:** [Content for this section will be added if this activity is selected for implementation.]

- **Intended Outcomes and Results:** The principal outcome of this pilot is an affordable and sustainable system enabling educators to produce and duplicate learning materials to improve education that can be scaled up across DBE3 and other schools in Indonesia. In addition, a successful pilot will produce a training module to build and strengthen the capacity of educators to create and duplicate high-impact learning materials for their students using a mix of digital and analog technology. An important and desired outcome that may result from the first two is better teaching and learning that is more active.

- **PPA Opportunities and Requirements:** This pilot activity has limited potential for multi-national or national-level PPAs to help support it since there are few vendors of hand-powered duplicators, and corporations do not generally distribute consumables such as paper and ink. However, it may be possible for schools to identify local companies that might either donate paper for printing or sell the paper at cost. Other companies may want to become sponsors of this activity in exchange for the ability to advertise.

- **Estimated Budget and Match:** [Content for this section will be added if this activity is selected for implementation.]

- **Estimated Time Frame:** The following outlines some specific tasks for this pilot with time estimates:

- Task 1: Prepare a detailed design for the pilot to determine if the equipment for this pilot is locally available and that maintenance and support are available—2 weeks.
- Task 2: Identify and select a mix of six to eight schools and NFEPs to participate in the pilot; develop and sign the collaborative agreements; prepare the monitoring and evaluation plan for the pilot; and collect baseline data for monitoring and evaluation—1.5 months.
- Task 3: Acquire the needed equipment kits and develop the training module to prepare staff and teachers at the schools and NFEPs to use create learning materials and the equipment—2 months.
- Task 4: Deliver the equipment to the schools and NFEPs and carry out the training—2 months.
- Task 5: Carry out the pilot and follow-up with monitoring activities—6 to 9 months.
- Task 6: Carry out the evaluation, write the report, and hold a workshop to present the results—2 months.

3.7 Pilot Alternative Computer Technologies

Background and Rationale

At present, when schools and NFEPs consider increasing the number of computers in their organization for student use or buying their first computers for student use, they only consider using conventional desktop computers. Unfortunately, conventional desktop computers, which are designed for use in office environments, not in the harsher or heavier use situations found in schools, often have many technical problems when used in schools. Since schools and NFEPs in Indonesia have no real budgets to maintain computer equipment, and investment in computer equipment consumes a great deal of scarce funds, equipment failure can be crippling for these organizations. A variety of alternatives to conventional desktop computers for use in schools have been developed recently that hold great promise for use in Indonesian schools and NFEPs. However, before these systems can be recommended and before school and NFEP leadership is likely to agree to spend money on these options, some of these options must be piloted under local conditions to see if they have a higher survival rate and a lower total cost of ownership (TCO) than conventional technology.

Activity Overview

This activity tests and evaluates the survivability, TCO, and educational benefit of alternative computer technologies in a selection of DBE3 schools and NFEPs.

Detailed Description

- **Activity Goals and Objectives:** The principal goal of this activity is to identify alternative computer technologies for use in DBE3 schools and NFEPs that are more suited to harsh operating environments and easier to maintain and keep in working condition. One objective of this activity is to identify technologies with a lower initial purchase cost and a lower TCO than conventional desktop systems. In carrying out this pilot of alternative computer technologies, the activity seeks to develop strategies that can be used to advise schools and NFEPs on the most appropriate technologies for their needs and good strategies for ongoing maintenance.

- **Target Audience(s):** This pilot is targeted to the leadership, teachers, and students of DBE3 schools and NFEPs.

- **Underlying Assumptions and Potential Risks:** The success of this activity depends on the following:
  - PPAs with one or more IT company to enable DBE3 to carry out this pilot project.
  - A select group of schools and NFEPs in different DBE3 locations agree to participate in this pilot.
  - DBE3 allocates funds for project staff to enable this pilot to be designed, PPAs to be orchestrated, the project to be implemented, and the pilot to be evaluated.

- **Necessary Conditions and Inputs:** The following condition is essential to carry out this activity:
  - Because of costs and the relative lack of project funds to buy equipment, it is essential that DBE3 be able to establish PPAs with computer equipment vendors or manufacturers that can provide alternative computer technologies for testing in DBE3 schools and NFEPs. Specifically, this includes Intel Corporation, HP, AMD, and Microsoft.

- **Staff/Skill Requirements and Level of Effort:** [Content for this section will be added if this activity is selected for implementation.]

- **Intended Outcomes and Results:** If this pilot is carried out, DBE3 can expect to achieve the following outcomes:
  - One or more computer technologies in schools and NFEPs are tested that may be an alternative to conventional desktops.
  - Alternative computer technologies in school environments that can save schools and NFEPs money via the initial purchase, savings in the cost of electricity, and lower maintenance costs are demonstrated.
  - Effective strategies to help schools and NFEPs make purchase decisions and improve the maintenance of equipment are developed.
  - Through lower cost technology options, more schools and NFEPs are able to provide students and teachers with access to computers.

- **PPA Opportunities and Requirements:** As mentioned earlier, this activity depends on DBE3's ability to secure partnerships with Information Technology (IT) companies. One such company is Intel, which, in partnership with others, has developed a "rural PC" designed for use in schools and public access facilities in developing countries. This low-cost system was tested for use initially in India, and Intel may be interested in partnering with AED and DBE3 to test this equipment in Indonesian schools and NFEPs. In addition, Hewlett Packard has a thin client system it might be interested in testing in schools and NFEPs in Indonesia. EarthWalk Communications, a small company near Washington, D.C., has an innovative mobile solution using rugged laptop computers that it may also be interested in having piloted in Indonesia. Finally, Palm computing and HP have handheld computers that may prove useful in schools and NFEPs in Indonesia.

- **Estimated Budget and Match:** [Content for this section will be added if this activity is selected for implementation.]

- **Estimated Time Frame:** The following outlines a possible time frame for this pilot:
  - Task 1: Prepare the detailed pilot concept paper—2 weeks.
  - Task 2: Market the concept paper with a mix of private sector companies to develop partnerships for this project. This task culminates in the development of a PPA and collaborative agreement for the pilot—1 month.
  - Task 3: Select schools and NFEPs to participate in the pilot and establish project agreements with each school—1 month.
  - Task 4: Order the equipment and have it shipped to Jakarta for configuring—1 month (runs parallel with Task 3).
  - Task 5: Prepare pilot monitoring and evaluation plan and collect baseline data—1 month (runs parallel with Task 3).
  - Task 6: Prepare orientation/training program for teachers and leadership at participating schools and NFEPs when the equipment is delivered and installed—1 week (runs in parallel with Task 3).
  - Task 7: Deliver the equipment and install it at the pilot sites; and carry out orientation training—1 week for each site.
  - Task 8: Ongoing use and pilot monitoring—6 months.
  - Task 9: Pilot evaluation, prepare report, and hold pilot review seminar—1 month.

APPENDICES

Appendix A: Other Possible ICT Activities

The following is a list of possible ICT activities from which DBE3 can choose for pilots or project interventions to help achieve program goals. They are not listed in any order of priority.

- ***Open Source Software:*** A pilot project to test the use of open source software applications, especially the OpenLab educational software suite, in schools and NFEPs.

- ***Technical Support Training Curriculum:*** In partnership with local groups, develop a training curriculum and support materials for use in NFEPs to prepare young people for entry-level ICT technical support and computer repair and maintenance positions. This curriculum can then be piloted in two to three other NFEPs located in communities where there is demand for ICT-related technical jobs.

- ***Cisco Network Academies***: In partnership with Cisco and NFEPs, establish one or two Network Academies to train young people to be entry-level network technicians.

- ***Web-Based Community of Practice:*** In partnership with DBE3 schools and NFEPs, local education NGOs, and Pustekom, design and develop web-based community of practice for DBE educators. This supports DBE3 training programs and enables teachers to engage in continuous professional development and collaborative learning activities.

- ***Enhance the MoNE's Education Portal:*** Establish a partnership with the MoNE to enhance its education portal to provide access to professional development resources and possibly online, in-service professional development training modules for teachers.

- ***Online Professional Development Modules:*** In partnership with Pustekom and national in-service teacher training centers, develop and pilot an ICT-enhanced curriculum for ongoing teacher professional development. These modules can be based on the DBE3 teacher training modules being developed for face-to-face workshops. This pilot builds local capacity to repurpose these modules for delivery over the Internet or via CD-ROMs.

- ***Digital Educational Content:*** Develop and pilot a program to train DBE3 educators to develop (original and repurposed) digital learning content for use in schools. This content can be made available to all educators in the DBE3 program via CD-ROMs and the Internet.

- ***WebQuest Indonesia:*** Explore a partnership with WebQuest to pilot an Indonesian version of this interactive educational program with middle school math, English, civics, and science students.

- ***School and Student Web Sites:*** Develop a program to enable schools and student teams to develop their own mini-web sites.

- ***Educational TV:*** Develop curriculum guides to enable teachers in schools and NFEPs to integrate the use of TV educational resources into teaching and learning. This can be linked

to a new MoNE program to expand access to educational TV across Indonesia.

- ***ICT Curriculum for Office Workers:*** Develop, adapt, and pilot an ICT skills training curriculum for entry-level office workers. This curriculum can target the needs of NFEPs that want to expand training for employment opportunities for their students.

- ***Hand-Held Computers for Evaluation:*** Pilot the use of PDAs to enhance DBE3's assessment, monitoring, and evaluation activities.

- ***Computer Refurbishing Facility:*** In partnership with Microsoft and local companies, pilot computer refurbishing facilities and training programs at two to three NFEPs.

Appendix B: Evaluating Different ICTs for Use in DBE3 and Other DBE Projects

DBE3 is using a very broad definition of Information and Communication Technologies (ICT). In addition to computer (desktops, laptops and thin clients) and Internet communication technologies (web sites, VoIP, collaboration technologies) that comprise the conventional definition of ICTs, DBE3 includes analog audiovisual technologies such as cassette players/recorders, video/TV systems, and duplication technologies (photocopiers and spirit/ink duplicators). DBE3's definition of ICTs also encompasses a mix of audiovisual digital technologies, including digital cameras, podcasting/MP3 technologies, scanning and printing technologies, publishing on-demand technologies, SMS and cell phone technologies, and PDA and handheld computers. The focus of DBE3's definition for ICTs is identifying the optimal and most easily sustainable technology solution(s) for the educational challenge being addressed within the realities of the local environment (physical, economic, energy, skills, etc.).

When assessing different ICT options to enhance education, it is important to consider a variety of factors before selecting one or more technologies as either stand-alone items or an integrated mix of tools. The following provides some thoughts on a variety of technology options and discusses some of the more important factors that should be considered before making a final decision. Crucial to this process is that all technology options, whether paper, books, cameras, manual duplicators, or computers, include a mix of related needs and consequences that must be carefully evaluated as well.

When assessing any ICT, it is important to evaluate the technology within the context of the following critical factors:

- Sustainability
- Affordability
- Replicability
- Scalability
- Usability
- Whether the technology delivers a significant level of educational benefit by enabling schools/teachers to deliver better-quality teaching and learning

The following is a sample assessment of one basic ICT, a film camera, to illustrate the importance of carrying out this kind of assessment. At first, people may think that cameras, since they are so familiar and simple, are easy to integrate into education.

An Assessment of Film Cameras for Educational Use

Film Cameras*:* A variety of film camera types can be considered. For this assessment, we are examining non-disposable, basic point-and-shoot 35 mm cameras with a fixed lens, flash, and manual film advance. Cameras with a zoom lens and motorized film advance are more expensive, have a shorter battery life, and are prone to more problems.

Important Educational Uses: Film cameras can be a powerful pedagogical tool to reinforce learning and provide teachers and students with opportunities to be creative and explore ideas, art, writing, and other areas of learning and expression. Film cameras are used most often in

schools as a means of keeping photographic records of school events, staff and students, activities, classes of students, special student projects, sports events, etc. Teachers may also use film cameras to help teach lessons. Students can use cameras to photograph something they find interesting and then write essays to describe their photographs. Film cameras can also be a powerful way of integrating artistic expression into learning. Students can use cameras to take pictures for learning projects and to illustrate the process they used to complete an activity, science experiment, group project, etc. Film cameras can also be used to duplicate pictures from books, which can then be used in learning projects and for instructional activities.

All of these uses depend on the availability of funds for consumables, access to film developing/printing services, curricula that allow for creative teaching and learning, and skilled teachers to create educational opportunities for students to use this technology. Simply providing film cameras to schools does not guarantee that any educational benefit will result. If schools receive only a single camera, it is likely to become part of the school office's collection of tools and not contribute to improving education.

***Principal Users*:** Principals, school administrative staff, teachers and students, individually or in teams. The greatest chance for educational benefit requires that cameras be provided to teachers and classrooms.

Training Requirements: Most teachers and students probably already know how to use simple film cameras and take pictures and where film can be developed and printed. However, it is also likely that school staff, teachers, and students only think of using cameras to create photographic records of people and events. They probably are not familiar with using a camera for educational purposes, caused partly by the likely scarcity of funds for sufficient quantities of film and processing to enable extensive educational use. To ensure that teachers learn to use film cameras to enhance teaching and learning, training activities should include use of cameras in training activities so teachers experience the educational power of photography directly. Simply describing "possibilities" without practical experience is unlikely to result in any educational use of this simple yet powerful technology.

***Similar, Alternative, and Related Technologies*:** Digital cameras, scanners, photo printers, disposable cameras, and 35mmSLR camera with interchangeable lenses.

***Initial Unit Cost*:** Prices for individual film cameras differ significantly, generally ($12 to $35), and there is a slight discount (~10% to 15%) for volume purchases.

Recurrent Costs: Film, developing, and printing are the major recurrent costs related to using film cameras in education. The cost of traveling to where film can be purchased, developed, and printed is another recurrent cost that should be considered when rural schools are given film cameras. For cameras with flash capabilities, batteries are another recurrent cost. If multiple copies of pictures are needed, this cost needs to be considered as well.

Partial Total Cost Of Ownership (P-TCO): The table below illustrates the possible costs in US$ for providing 20 teachers in a school with cameras and a budget to integrate the use of the film cameras into their teaching and student learning. The monthly film and processing budget is based on only two rolls of 24-exposure film and single prints. Only 10 months of use per year are projected. For training and learning, an initial set of three rolls of 24-exposure film are projected. The example also assumes that half of the cameras will need to be replaced in Year

3 either because of damage, loss, or teachers leaving and being replaced. You can change the different estimated costs by double-clicking on the table. The embedded spreadsheet will then become active so you can change the estimated values to reflect local realities. The total estimated cost for using film cameras in this school for three years is $16,110. This estimate does not include the costs to procure and deliver the technology and train the teachers. It also does not include administrative costs to provide schools with three years of funding to uses these cameras. Finally, this table does not include estimated costs for the school to manage this equipment or for staff to travel to where film can be processed.

	Year 1			Year 2			Year 3		
Items	**Unit Cost**	**Units**	**Total**	**Unit Cost**	**Units**	**Total**	**Unit Cost**	**Units**	**Total**
Camera	$20	20	$400		20	$0	$20	10	$200
Case	$5	20	$100			$0	$5	10	$50
Initial Film (training & learning 3-24 exposure w/ processing)	$36	20	$720			$0			$0
Batteries (4 AA batteries/year)	$4	20	$80	$4	20	$80	$4	20	$80
Monthly film budget (2-24 exposure roles)	$12	10	$2,400	$12	10	$2,400	$12	10	$2,400
Monthy Developing (single 4"x5" prints)	$12	10	$2,400	$12	10	$2,400	$12	10	$2,400
TOTAL			**$6,100**			**$4,880**			**$5,130**

Essential Additional Resources and Technologies: Film cameras require film, facilities for developing and printing the pictures, a way to manage the negatives, and possibly a system to store, display, and use the resulting pictures. A case for the camera is important to keep the camera clean and thus extend its useful life. Cameras with flash capabilities also require batteries. Smaller cameras may require small lithium batteries that may not be available locally. Before buying cameras for distribution, it is essential to learn whether all needed consumables are available locally. It is also essential that schools, and preferably teachers, have sufficient budgets to buy and process film. Project staff should also work with schools and parent-teacher associations (PTAs) to create the capacity to provide funds to use the cameras after the project ends and to replace cameras when they wear out, break, or are lost. If projects cannot predict how the educational use of cameras can be sustained after the project, it may not be appropriate to provide schools with cameras. Providing only temporary benefit for only a few students may not provide a sufficient ROI to justify using this technology.

Security and Durability Considerations: Film cameras, like all small mobile technologies, are easily stolen or lost. If cameras are “given” to individual teachers as part of their school equipment/material kit, this may entail less risk than if they are provided to schools and then taken by teachers or others as needed. In addition, providing teachers with these cameras can help ensure that they will be used to enhance education. These cameras can last many years if care is taken and they are not dropped. The most inexpensive of these basic film cameras have plastic lenses that can be scratched easily, especially in dusty environments, rendering the camera useless. Dust can also creep into the body of the camera and damage the drive mechanism and shutter and cover the inside of the lens, lowering picture quality and eventually leading to camera failure.

Usable Life Cycle: With proper care, the useful life of a simple film camera is estimated to be five years. If teachers and schools do not care, use, and store their cameras properly, their useful life could be a year or less.

Management Overhead: All types of ICTs, in fact all types of resources, introduced to schools bring with them direct and indirect management costs and management overhead. Issues such as storage, buying consumables, allocating use among staff, preventing theft, making sure staff know how to use the resources, buying the resource, securing the grant or organizing the fund raiser, etc., all involve some cost. Usually, the costs related to the management overhead associated with a technology are not considered or, worse, are assumed to be zero.

Film cameras have relatively low management overhead compared with computers and electronic devices. One aspect of a film camera's management overhead is keeping film on hand (since heat causes film to degrade, it may need to be stored in a refrigerator), organizing the developing and printing of the film, and ensuring that the battery in the camera has a good charge. Keeping the cameras from being lost or stolen is more difficult and time consuming. Managing their use and making sure that all teachers know how to use them properly are other aspects of this technology's management overhead. Rural or more remote schools and NFEPs will experience a higher level of management overhead with cameras than will other schools **since film, printing and batteries will be more difficult to obtain.** Also, the more cameras a school or NFEP has, the greater the management overhead will be. For example, the school may need to buy a special lockable cupboard to keep cameras secure and clean.

The most significant management overhead involved in using cameras in an educational way, as with all ICTs, is helping teachers use them to reinforce learning and enable active learning. This demands training and ongoing professional development.

Appendix C: Information about Ink and Stencil Duplicators

As shown in the pictures above, ink and stencil duplicators come in two main types, ones that run primarily with electricity and those that are primarily manual. Both systems use tubs of ink and stencils and any type of paper to duplicate printed material and pictures. Stencils can be produced by hand by writing, drawing, or typing on a blank stencil. Ink is then pressed through the stencil during printing to transfer the text and/or images to the paper. Unlike photocopiers or laser jet or inkjet printers, these duplicators do not need a special kind of paper. For example, schools can use the least expensive newsprint paper to duplicate exercise, worksheets, tests, reading material, etc., at a much lower cost than with other duplication options.

If electricity is available, stencils can be produced digitally using an electric stencil-making machine that creates a stencil from a pre-existing document or picture.

Stencils can be reused many times as long as they are cleaned after each use.

These duplicators are easier and less costly to maintain than are photocopiers. However, they are not a good solution if only a few copies are needed; they are best when many copies are needed.

Appendix D: The Intel Community and Classmate PCs [22]

The Community PC, designed by Intel, is a PC designed specially to withstand harsh climates, fluctuating power supplies, extreme temperatures, high dust levels and lack of IT support in remote areas.

The Community PC would be primarily used in shared usage model in rural area of emerging markets such as schools and telecenters.

Features and Benefits
The unique features of the Intel-powered Community PC are:

- Runs on a car battery to counter fluctuating power supplies
- Consumes lower power
- Withstands extreme climatic temperatures due to a thermally redesigned chassis
- Has a fitted dust filter to combat problems related to high dust level
- Is enabled with value added software such as Power Management, Asset Management (Linux only) and System Management

The Classmate PC, developed by Intel Corporation, is a small, mobile learning assistant and educational solution specially developed for students in emerging markets. It's a rugged learning device designed to provide affordable, collaborative learning environments.

The Classmate PC has been designed as a "tool to think and learn with" with the aim of transforming education. Toward this goal, Intel has devised a platform that meets the needs and goals of different players, namely, students, teachers, parents, school staff, and policymakers, while addressing the pedagogical, technological, social, and physical requirements of school environments.

The Classmate PC is designed with a set of particular features, such as:
A rugged, lightweight, and easy-to-carry design, integrated handwriting hardware technology, and software stack with validated educational applications (for example, education management technology). Wireless and messaging systems that allow tight integration and collaboration between users from different groups, allowing them to share experiences, communicate and coordinate activities.

The Classmate PC integrates and provides the following properties:

[22] This appendix was adapted from content on Intel's websites: *http://www.intel.com/support/desktopplatforms/communitypc/sb/CS-023248.htm* and *http://www.classmatepc.com*.

Designed for Education

- Includes an education-specific feature set.
- One computing solution per student.
- Small form factor that integrates easily into the classroom.
- Allows teachers to monitor classroom activity as well as supplement and extend their lectures with interactive material.
- Allows students to collaborate, exchange information, and review e-learning material.
- Enables learning through fun, collaboration, and interaction.

Flexible Platform solution

- A durable rugged design for children's day-to-day use.
- An easy-to-carry, lightweight, personal learning assistant that looks like a textbook.
- A product that delivers great student education usage in an industrial design intended for children, but still incorporating essential notebook PC features.
- An integrated software and hardware solution that allows classroom, learning, and content management.
- Allows parents to track their child's progress in school and facilitates parent-teacher communication.
- Provides theft control.

Appendix E: School Survey Questionnaire

Province:_____

District: _____

Sub-District: _____

Date of interview: _____

School/Non-Formal Education Provider (NFEP) Information

School/NFEP Name:_____

School/NFEP No: _____

School / NFEP Type:

Government Public School	☐
Private Public School	☐
Non-Formal Education Provider	☐
Community Learning Center	☐
Government Madrasah	☐
Private Madrasah	☐
Pesantran	☐

Interviewer: _____

Interviewee: _____

Position in School: _____

Male ____ Female ____

Number of students attending school/NFEP: _____ (total)

Boys _____ Girls _____

Number of teachers/tutors/ustadz teaching: _____ (total)

Male ____ Female ____

Full time teachers/tutors/ustadz: _____ Part time teachers/tutors/ustadz _____

General School Information:

1. Does the school/NFEP have electricity?	**YES ☐**	**NO ☐**
a. If **YES**, do all offices and classrooms or learning areas have working electric lights? (verify)	**YES ☐**	**NO ☐**
b. If **YES**, do all offices and classrooms or learning areas have working electric outlets? (verify)	**YES ☐**	**NO ☐**

c. If **YES**, is the electricity used to support student education?	**YES ☐**	**NO ☐**
d. If **YES**, what is the electrical capacity in watts at the school?	**Watts:**	**DK ☐**
e. If **YES,** how is this electricity provided to the school: (Check all that apply.)	**Main-line power: ☐** **Diesel or gas generator: ☐** **Micro-hydro generator: ☐** **Solar panels: ☐** **Wind generators: ☐**	
2. Does the school/NFEP have one or more working telephones (landline)?	**YES ☐**	**NO ☐**
a. If yes, how many lines?	**# Phones:**	
b. If no, how does the school communicate with the district offices or other entities? (check all that apply)	**By cell phone: ☐** **By Radio: ☐** **By Post/mail: ☐** **By other means:** _____	
3. Is there an active school committee?	**YES ☐**	**NO ☐**
a. If yes, how often does the committee meet? (Write in number next to unit of time.)	**/ Month**	**/ Year**
b. If yes, how many members by the following categories of members?	**Teachers:** **Parents:** **Principal:** **Business:** **Govt. Officials:** **Students:** **Religious leaders:** **Community Leaders:**	
c. If YES, how many members participate regularly in meetings:	**Number of members who participate:**	

Computers and Internet Access:

4. Does the school/NFEP have any computers?	**YES ☐**	**NO ☐**
If no, please go to question 7. If yes, please continue with the following questions.		
a. How many of these computers are for students and how many of these are fully functional? (verify) (Functional means that they can be turned on, that applications can be run on the computer, and files can be created and saved to a floppy disk.)	Number of Computers:	Computers that are Working:
b. Are the student's computers organized in one or more computer lab? *(Take pictures of the computer lab(s) showing a larger part of the lab, individual computer stations, the teachers station, the connectivity equipment if present, and other items to show the general state of the lab. Be sure to record which pictures go with which school.)*	**YES ☐**	**NO ☐**

c. If the student's computers are not organized to make a computer lab, where are they located? (Check all that apply?)	**Office: ☐** **Classrooms: ☐** **Teachers' room: ☐** **Activity or other rooms: ☐**	
d. If yes, how many computers are in each lab?	**Lab 1:**	**Lab 2:**
e. How are the computers arranged in the lab:	**In Rows: ☐**	**Along Walls: ☐**
f. Are the computers in the lab connected together to form a **local area network (LAN)**?	**YES ☐**	**NO ☐**
g. Is there a computer in the lab that functions as a **server**?	**YES ☐**	**NO ☐**
h. If a lab computer functions as a server, what are the main server functions: (Check all that apply.)	**File sharing:☐** **Sharing Internet access**: ☐ **To create in Intranet: ☐** **Share access to a printer: ☐**	
i. Is there a printer in the computer lab or available for student use?	**YES ☐**	**NO ☐**
j. Is the lab secure? (e.g. bars on the windows and the door, secure locked door)	**YES ☐**	**NO ☐**
k. What **operating systems** are most commonly present on the school's computers? (Check all that apply and verify.)	**MS-Windows 98: ☐** **MS-Windows XP: ☐** **MS-Windows ME: ☐** **MS-Windows 2000: ☐** **Linux: ☐**	
l. Is the operating system on these computers in English or Indonesian?	**English: ☐**	**Indonesian: ☐**
m. What application software is present on the school computers? (In addition to asking this question, turn on 2 to 3 computers and look at the program listing to see which of these applications are present.) (Check all that apply.)	**MS-Office: ☐** **MS-Word: ☐** **MS-Excel: ☐** **MS-PowerPoint: ☐** **MS-Access: ☐** **Outlook: ☐** **Adobe Acrobat Reader: ☐** **Antivirus software: ☐** **WinZip: ☐** **Open Office: ☐** **Graphics program: ☐** **MS-FrontPage: ☐** **MS-Encarta: ☐** **Internet Explorer: ☐** **FireFox: ☐** **Other software:**	
n. Are the applications in English or Indonesian?	**English: ☐**	**Indonesian: ☐**
o. Are web sites cached on the hard drive for off-line browsing?	**YES ☐** **NO ☐** **Do not know what this is: ☐**	
p. Does the school have a selection of educational CD ROMs from Pustekom or another source?	**YES ☐**	**NO ☐**

p. W hen did the school first buy computers for students? (Some schools may have been buying them over a period of years, list all years starting with the first year computers were purchased.)	**Year/Years:**	**_____, _____, _____, _____. _____.**
q. Were all the computers acquired new? If no, please write in an explanation below the question:	**YES ☐**	**NO ☐**
_____ _____		

Computers and Internet Access (Continued):		
r. How did the school acquire their computers? (Check all that apply.)	**Grant from MoNE/MoRE: ☐** **Donations from parents: ☐** **International project: ☐** **Funds from foundation: ☐** **Donation from company: ☐** **From school's annual budget: ☐**	
s. How many computers are in the teachers' room and working?	**No. of Computers? _____** **No. Functioning?**	
t. How many computers are in the school's office for administration or principal?	**No. of Computers? _____** **No. Functioning?**	
5. Does the school/NFEP have a specific budget for computer maintenance each year?	**YES ☐**	**NO ☐**
a. If the school has a computer maintenance budget, how much is allocated each year?	**Maintenance budget: _____**	
6. Does the school/NFEP have access to the Internet?	**YES ☐**	**NO ☐**
If NO, please go to question 7. If YES, please continue with the following questions.		
a. What type of access to the Internet does the school have? (Check all that apply):	**Dial-up via phone line: ☐** **Broadband/high speed access: ☐** **Access to only one computer: ☐** **Access for two or more: ☐** **Access in teachers' room: ☐** **Access for student's: ☐** **Access in school office: ☐**	
b. What is the approximate monthly cost for the school's Internet access?	**Cost: _____**	
c. Where does the money come from to pay for this access? (Check all that apply.)	**Grant from MoNE/MoRE: ☐** **Donation from parents: ☐** **Donation from company: ☐** **International project: ☐** **School fundraising: ☐** **Extra student fees: ☐** **Annual school budget: ☐**	

Computers and Internet Access (Continued):		
d. How does the school use its Internet access? (Please list uses of the Internet in order of priority: 1=most often/important use in this way. 2=next most often/important use. 3= etc. NU=Never or rarely used this way. Each space should be filled in with a number or an "NU")	**By school administration to send data to government office:**	
	By school administration to send and receive e-mail:	
	By teachers to communicate via e-mail:	
	By teachers to access educational resources and/or research:	
	By teachers to enhance the teaching of their classes:	
	By ICT classes to teach students to use the Internet:	
	By students to communicate, research or learn online:	
	For recreation or entertainment:	
	To provide "Warnet" services to generate revenue:	
	Other Uses: _____ _____ _____ _____	

Technology in Education:

7. Does the school/NFEP offer ICT courses?	**YES ☐**	**NO ☐**
If NO, please go to question 9. If YES, please continue with the following questions.		
a. How many teachers/tutors have responsibility for teaching the ICT subject?	**Number of teachers: _____**	
b. Do the ICT teachers/tutors also teach other subjects?	**YES ☐**	**NO ☐**
c. How did the ICT teachers/tutors learn their ICT skills/knowledge?(Check all that apply.)	**Self taught: ☐** **Studied ICT in college: ☐** **At workshops: ☐** **Other: _____**	
d. How many of the ICT teachers/tutors have e-mail accounts?	**Teachers with email: _____**	
e. How many different ICT class are offered each week?	**No. of ICT classes: _____**	
f. How many students are in each ICT class?	**Year 1:**	

	Year 2:	
	Year 3:	
g. Do students use computers in teams?	**YES ☐**	**NO ☐**
h. If students use computers in teams, how many students per team:	**Students / team: _____**	
i. How many hours per week is allocated for teaching the ICT subject?	**Hours per week: _____**	
j. Is an ICT program offered as an extra-curricula activity?	**YES ☐**	**NO ☐**
k. If there is an ICT extra-curricular activity offered, how many hours/week does this happen?	**Hours per week: _____**	
l. If there is an ICT extra-curricular activity offered, how many students participate?	**Number of students: _____**	
m. What ICT topics are taught and what year are they taught? *(Write in 1, 2, and/or 3 where appropriate.)*	**Topics**	**Year 1, 2, or 3**
	Hardware	
	Beginning Word:	
	Internet:	
	FrontPage:	
	Beginning Excel:	
	Keyboarding/typing:	
	PowerPoint:	
	MS Windows:	
	Advanced Excel:	
	Databases:	
	Advanced Word:	
	e-Mail:	
	Visual Basic:	
	Linux:	
	Open Office:	
8. For non-formal education providers (NFEP/CLCs): Does the provider offer any of the following computer related courses? (Check all that apply.)	**Basic ICT literacy classes:**	
	Computer programming:	
	Excel for accounting:	
	Computer repair & maintenance:	
	Computer typing/word processing:	
	Computers for business:	
	Computer networking:	
9. Teachers/tutors ICT knowledge and skills:		
a. How many teachers at the school are … (Write the estimated number in each of the four boxes.)	**Advanced users of computers and the Internet:** (Advanced skills would include: ability to register for a Yahoo mail account; find, evaluate and download free software on the Internet and	Number of Teachers:

	download and install on a computers; install software either from the Internet or from a CD-ROM, connect and configure computer peripherals, update Windows; update an antivirus software, set up an Excel spreadsheet to create a basic budget, track student grades and that include formula to make calculations; create an interactive table of contents with MS-Word; create headers and footers in MS-Word; use styles in MS-Word; create a Power Point presentation with slide transitions and animation schemes, burn CDs, etc.)	
	Intermediate users of computers and the Internet: (Intermediate skills would include: ability to use an Internet search engine to local content on the Internet; download and view PDFs; create a letter with MS-Word that would include bold, italics, and tables; create a basic Power Point presentation; use Excel to carry out basic, addition, subtraction, division, multiplication on one or two columns of numbers; save files to an external floppy diskette; use Windows explorer to navigate the computers drives and files, etc.)	Number of Teachers:
	Beginning users of computers and the Internet: (Beginning skills would include the ability to turn on the computer and start an application; open a browser and find a web site, use hyper links to jump from one site to another site; create and print a very basic	Number of Teachers:

	document in MS-Word with no special formatting.)	
	Have no real experience using computers:	Number of Teachers:
b. Do teachers of other subjects (math, English, Indonesian, civics, science, packet b/c, skill class, etc.) use the school computers in the teaching of their subjects?	**YES ☐**	**NO ☐**
c. If teacher do use computers to help teach their subjects, which subject teachers use computers in some way in the teaching of their subjects: *(Check all that apply.)*	**Indonesian:**	
	Science:	
	Social Studies:	
	History:	
	Life Skills:	
	English:	
	Civics:	
	Economics:	
	Vocational subjects:	
	Math:	
	Religion:	
	Geography:	
	Packet B and/or C:	
10. Does the school/NFEP offer all teachers ICT literacy or ICT training course?	**YES ☐**	**NO ☐**
a. If yes, how often are these courses offered each year?	**Courses per year:**	
b. If yes, how many teachers have taken these courses?	**No. of teachers:**	
c. How many non-ICT teachers at the school have personal or school e-mail addresses?	**Teachers w/ email:**	

11. What other types of technology does the school/ NFEP have to enhance teaching and learning?

* Uses might include:

1. administration/management;
2. teachers teaching or preparing teaching materials;
3. student uses; and
4. community uses. Please distinguish between these uses. If equipment is kept in the principal's office, please ask how often and how students use the equipment if they state that it is for student use.

Technologies:	Number working	Most common uses if present*
TV with DVD/Video:		
Radio cassette/CD player:		
Simple Radio:		
Overhead projector:		
LCD projector:		
Laptop computer:		
Movie projector:		
FAX machine:		
Computer printer (inkjet):		
Computer printer (laser):		
Scanner:		
Photo copier:		
Spirit/Ink & Stencil duplicator:		
Film camera:		
Digital camera:		
Video camera (tape):		
Video camera (digital):		

12. In the last year, have there been training programs, workshops or other events at your school or in your community to expose teachers to computer and	**YES ☐**	**NO ☐**

Internet technologies or to demonstrate the use of computers and Internet technologies for education?		
13. How can teachers and students get access to computers and the Internet outside of school or the NFEP? (Check all that apply.)	**At another school:**	
	At home:	
	At a Warnet:	
	None	
14. How far from the school is a Warnet that has Internet access?	**Distance: (km)**	**Distance: (time):**
15. How many teachers working at the school/NFEP have computers at their home?	Estimate: 75 % or more ☐ 50 – 75 % ☐ 25 – 50% ☐ up to 25% ☐ None ☐	
16. Of teachers with computers at home, how many have Internet access?	Estimate: 75 % or more ☐ 50 – 75 % ☐ 25 – 50% ☐ up to 25% ☐ None ☐	
17. How many students at the school/NFEP have computers at home?	Estimate: 75 % or more ☐ 50 – 75 % ☐ 25 – 50% ☐ up to 25% ☐ None ☐	
18. Of these students with computers at home, how many have Internet access?	Estimate: 75 % or more ☐ 50 – 75 % ☐ 25 – 50% ☐ up to 25% ☐ None ☐	
19. Does the school or NFEP have an actively used and managed library?	**YES ☐**	**NO ☐**
a. If yes, please visit and rate the library: (Check only ONE item.) (Take at least one picture of the library.)	Excellent:	
	Good:	
	Fair:	
	Poor:	
20. Are there organizations or companies in town or community where the school or NFEP is located that provide installation, maintenance and technical support services for computer equipment in schools?	**YES ☐**	**NO ☐**
21. If your school has electricity but no computers, what are the three most import reasons for not having computers at your school? *(Please write 1, 2, and 3 where appropriate with 1 being the most important reasons.)*	Lack of money:	
	Lack of space/facility:	
	Lack of skills & knowledge:	
	Not required to by curriculum:	
	Low priority:	
	Lack of support by leadership:	

	Other reason: _____

General observations about the school or NFEP:

Definitions of some technical terms used in the survey:

Adobe Acrobat Reader: This is a free software application used to view PDFs (portable document format). This software can be freely downloaded from the Internet. PDFs is a format for saving files that allows the document to be viewed and printed in its original format by any other computer even if the user doesn't have the software used to create the document.

Antivirus software: This type of software is used to protect a computer from malicious software called viruses that can damage files or disrupt the function of a computer.

FireFox = This is another type of Open Source software. It is a replacement for Internet Explorer and allows uses to browse the Internet. As with all Open Source software, there is no license fee to use this product. I use FireFox often because it is faster than Internet Explorer and has fewer problems with viruses and other evil software. http://www.mozilla.com/firefox/

Graphics program = These are software applications that allow users to create and manipulate digital photographs, images or other digital graphics.

Intranet = An Intranet is similar to the Internet but it only exists on a LAN. An Intranet allows a school or company to create a private local Internet, it has all the functions of the public Internet and allows the school or company to create and maintain private web sites that can only be accessed from one of the computers connected to the LAN.

Internet Explorer = This is a Microsoft software application that is used to view and navigate web sites on the Internet or in an Intranet.

Local Area Network (LAN) = This is when two or more computers are connected together by cables/wires or wirelessly so that digital files can be shared, each computer can print from a common printer, each computer can access common files and applications or even share a connection to the Internet if connectivity is present.

MS-Access = This is a Microsoft software application used to create and manage data bases.

MS Encarta=This is a Microsoft product that is digital encyclopedia and dictionary. This is really an incredible software application for education. I don't believe that it is available in *Bahasa* Indonesia, but it would be an excellent tool for helping student's learn English and for teachers to prepare content for their classes. And for schools without libraries, it can provide outstanding reference materials.(http://www.microsoft.com/products/encarta/default.mspx)

MS-FrontPage = This is a Microsoft software application that is used to create web pages for use on the Internet or on an Intranet.

Open Office = This is an open source (there are no license fees on open source software, you can simply download them from the Internet or distribute copies of this software via a CD-ROM) software application that replicates Microsoft Office, it includes a word processor, spreadsheet, presentation packages like Power Point, and a data base. There are also some utilities with this software. There are versions of Open Office that will run on Windows and on Linux. Files created in MS-Office can be opened by Open Office and files created with Open Office can be opened and used on MS-Office. Schools can use Open Office in place of MS-Office without having to pirate (steal) software. I asked this question to learn how prevalent open source software is in the schools and NFEPs that we are working with. http://www.openoffice.org/

Operating System (OS) software = This is special software that makes the computer functional. For most computers in the world come with Microsoft Windows installed as the operating system software. Windows 98 is a common type of Microsoft OS. The newest Microsoft OS is Windows XP. Another operating system software is called Linux. This software is not commercial and the code that Linux is written in is publicly available (Open Source) for people to modify. Copies of Linux can be legally downloaded for free from the Internet. Microsoft Windows 98 or XP are commercial products and should be purchased.

Outlook = This is a Microsoft software application used to create, send and receive e-mail messages.

Server = This is a computer that is part of a LAN that provides a common storage point for files and/or applications (software) and can provide access by all computers in the network to a printer and the Internet (if available). A server can either be a special computer that isn't used by students or regular staff or it can be a computer like all other computers in the Network that functions as a normal computer and a server at the same time.

Visual Basic = This is a Microsoft software application that is used to write computer application in Microsoft's visual basic language.

WinZip = This is a software application used to compress or un-compress files to and from the Zip format. People compress files so that they use less space on a computer and are smaller in size so that they can be sent with e-mail messages and downloaded from the Internet in less time. There are a variety of "Zip" utility application that can be used to compress (create a Zip file) or un-compress the Zip file to its original condition.

Appendix F: Cohort 1 Junior Secondary Schools and Non-Formal Education Providers Surveyed

Province	**Number of JSSs Surveyed**	**Number of NFEPs Surveyed**
Banten	12	11
Jawa Barat	13	12
Jawa Tengah	20	21
Jawa Timur	19	23
Sulawesi Selatan	20	22
Sumatera Utara	19	19
Total	**103**	**108**

Appendix G: Detailed Data

Access to telephone lines, by type of institution and by province

Province	Number of Institution that have telephone lines				Percent (%)	
	FE		NFE		FE	NFE
	Total Surveyed	Yes	Total Surveyed	Yes		
Sumatera Utara	19	17	19	3	89	16
Banten	12	12	11	5	100	45
Jawa Barat	13	12	12	4	92	33
Jawa Tengah	20	16	21	9	80	43
Jawa Timur	19	18	23	15	95	65
Sulawesi Selatan	20	17	22	9	85	41
Total	103	92	108	45	**89 %**	**42%**

Percentage of Junior Secondary Schools with Computers, by Province

Province	Number of JSSs with Computers	Number of JSSs Surveyed	Percentage of JSSs with Computers
Banten	12	12	100%
Jawa Barat	10	13	77%
Jawa Tengah	18	20	90%
Jawa Timur	21	22	95%
Sulawesi Selatan	17	21	81%
Sumatera Utara	12	15	80%
Total	90	103	87%

Percentage of Non-Formal Education Providers with Computers, by Province

Province	Number of NFEPs with Computers	Number of NFEPs Surveyed	Percentage of NFEPs with Computers
Banten	5	11	45%
Jawa Barat	6	12	50%
Jawa Tengah	11	21	52%
Jawa Timur	15	24	63%
Sulawesi Selatan	7	21	33%
Sumatera Utara	3	18	17%
Total	47	107	44%

Distribution of school/NFE by availability of computer lab.

Computer Lab	SMP	MTs	PKBM	SKB	Pontren	LSM	Total
No	24	25	44	21	25	8	147
Yes	36	18	7		3		64
Total	60	43	51	21	28	8	211

Type of access to the Internet by type of institution

Access to internet		FE	NFE	Total	% FE	% NFE
No		78	108	186	76.5	99.1
Yes		24	1	25	23.5	0.9
Type of Access	Dial-up	15	2	17	14.7	1.8
	Broadband	5	1	6	4.9	0.9
	For 1 computer	11	1	12	10.8	0.9
	For ≥ 2 computer	3	0	3	2.9	0.0
	In Teacher room	0	0	0	0.0	0.0
	For student	2	0	2	2.0	0.0
	In School Office	6	2	8	5.9	1.8
Total		102	109	211	100	100

Maintenance budget/year for Computer

(a) Per school/NFE

FE/NFE	N	Mean	Minimum	Maximum
FE	53	3,740,340	200,000	36,000,000
NFE	10	688,600	36,000	2,500,000
Total	63	3,255,937	36,000	36,000,000

(b) Per computer

FE/NFE	N	Mean	Minimum	Maximum
FE	53	254,559	19,231	1,500,000
NFE	10	246,633	36,000	750,000
Total	63	253,408	19,231	1,500,000

Number and percentage of school/NFE that offer ICT to students

Province	ICT Course				ICT Course (%)			
	FE		NFE		FE (%)		NFE (%)	
	No	Yes	No	Yes	No (%)	Yes (%)	No (%)	Yes (%)
Banten	1	11	9	2	8	92	82	18
Jawa Barat	2	11	7	5	15	85	58	42
Jawa Tengah	2	18	15	6	10	90	71	29
Jawa Timur	5	14	18	5	26	74	78	22
Sulawesi Selatan	6	14	18	4	30	70	82	18
Sumatera Utara	8	11	14	5	42	58	74	26
Total	24	79	81	27	23	77	75	25

Relationship between having computer lab and offering ICT subject

			Computer Lab Available		Total
			No	Yes	
FE	ICT Subject taught	No	17	6	
		Yes	31	48	79
	Total		**48 or 65%**	**54 or 89%**	102
NFE	ICT Subject taught	No	80	2	82
		Yes	19	8	27
	Total		**99 or 19%**	**10 or 80%**	109

Number of teachers and students having computer and access to internet

a. No. of teachers that have computers at home

# teachers have comp at home	# FE	# NFE	Total
None	10	23	23
≤ 25%	53	48	101
25-50%	15	13	28
50-75%	7	10	17
≥ 75%	8	1	9
Total	102	109	211

b. No. of teachers that have Internet access

# teachers have Internet access	# FE	# NFE	Total
None	69	81	150
≤ 25%	24	13	37
25-50%	2	1	3
50-75%			
≥ 75%	1		1
Total	102	109	211

c. No. of students that have computers at home

# students have comp at home	# FE	# NFE	Total
None	34	78	112
≤ 25%	44	11	55
25-50%	11	2	13
50-75%	2	2	4
≥ 75%	2		2
Total	102	109	211

d. No. of students that have Internet access

# students have Internet access	# FE	# NFE	Total
None	65	87	152
≤ 25%	24	3	27
25-50%	1	1	2
50-75%	2		2
≥ 75%			
Total	102	109	211