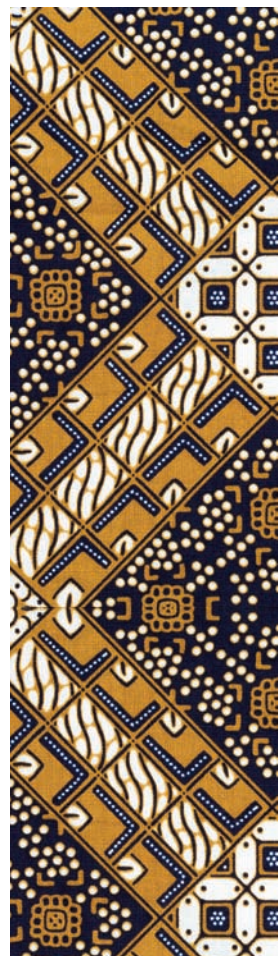


Computer System Sustainability Toolkit

A Practical Guide for Schools
Second Edition

DR. ERIC RUSTEN, AED Information Technology Applications Center



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AED Information Technology Applications Center

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[A Testament to the Toolkit's Effectiveness]

“It is a simple formula and it works! The sustainability program really works in my computer lab. Starting from the workshop on planning for our own sustainability roadmap, then forming a small team to manage the computer lab, and starting the SSTC [Student Support Technicians Club] for day-to-day operation, our computer lab is now running well. All computers are working and are well maintained by the SSTC under the ICT instructor’s guidance. The SSTC is phenomenal; it is just amazing how this simple idea is so effective. The members of the SSTC are enthusiastic because they gain more skills. This idea of the SSTC is like a tipping point which is responsible for making our school’s computer lab run well without extra expenses. Now my computer lab has 1X internet connectivity [a form of CDMA2000 cellular connectivity (see Unit 4)] so we can keep connected with the world! We’d like to now expand to build a training center and cyber cafe to achieve stronger sustainability through a business model.

In advancing my computer lab, I basically provide appropriate support for the team. I also delegate more responsibility to my ICT instructor. I realized that the instructor is the key success factor for the computer lab. Through greater autonomy and more authority, the instructor is more confident about improving the computer lab. In managing the cash flow, I also encourage finances to be disclosed in monthly reports to the stakeholders of computer lab.”



—Arman, *Principal of SMAN 1 Buay Bahuga Public School in Southern Sumatra, Indonesia*

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- How should the SPT be organized and operate?



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UNIT 4: OBTAINING, OPTIMIZING AND SUSTAINING INTERNET ACCESS

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UNIT 5: EVALUATING YOUR CURRENT COMPUTER SYSTEM

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- What information should we collect about our school's computer resources?
- What should we do with the data from our school's computer system assessment?
- How do we, the school administrators, teachers, students, and others, use our school's computer resources?



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- How can we maintain our valuable computers without spending a lot of money?



UNIT 7: GENERATING INCOME

- How might we use our valuable computer resources to generate revenue to help us maintain and grow our computer system?
- How should we run our brainstorming session?
- Are there other ways the SPT can generate ideas to raise the money needed to sustain our computer system?
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- Are there any really important things we should keep in mind as we explore using our computer system to generate income?
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- What kinds of things should be included in estimating the total cost of running an income generating activity?



UNIT 8: MAINTAINING YOUR BUDGET

- How can we determine whether our income-generating activities are creating a surplus and whether the net income is covering the cost to sustain our computer system?
- How can we promote and diversify our revenue-generating strategies?
- How can we increase the number of “customers” who buy our services or participate in our fundraising activities?



UNIT 9: MONITORING YOUR PLAN

- How do we know if our sustainability plan is working?

Acronyms

AED	Academy for Educational Development
CNA	Cisco Networking Academy
CPU	Central Processing Unit
CSS	Computer System Sustainability
FGD	Focus Group Discussion
ICT	Information and Communication Technology
IE	Internet Explorer
ISP	Internet Service Provider
NGOs	Non-Governmental Organizations
OLPC	One Laptop Per Child
OS	Operating System
PDF	Portable Document Format
SPT	Sustainability Planning Team
SSTC	Student Support Technician Club
TCO	Total Cost of Ownership
USAID	United States Agency for International Development

Acknowledgements and Background

The first edition of the *Computer System¹ Sustainability Toolkit* was developed as part of a pilot project funded by the Qualcomm Wireless Reach™ initiative with six schools in Indonesia² and based on AED's experience in Indonesia as a partner in the Decentralized Basic Education-Three (DBE3) project funded by USAID. Qualcomm, through the Wireless Reach initiative, funded the translation of the first edition of the Toolkit from English to Indonesian, and the printing of the first edition of the Toolkit in English. Cisco Corporation, another partner of Qualcomm's pilot project with the six schools in Indonesia, paid to print the Indonesian language edition. Qualcomm's Wireless Reach™ program also provided funds to AED to support editing and graphic design services for the first edition of the Toolkit.

Dr. Eric Rusten of AED's Information Technology Applications Center (ITAC) conceived of and wrote the first edition of the Toolkit and the additional content for this second edition. Josh Woodard, also from AED, developed many of the Toolkit's templates and created the self-help Jing Videos to help people learn to use several Toolkit tools. Josh also managed the production of the Toolkit and helped with editing both editions. Anne Quito and Brian Campbell, of AED's Social Change Group designed and produced the Toolkit's layout. AED also provided material support during the writing and design of the Toolkit. The Wireless Reach™ pilot project did not cover the cost of writing the first edition of the Toolkit due to a lack of funds. Because of the importance of this topic to the Indonesian education system and schools in other countries, Dr. Rusten donated his time to write the Toolkit. AED covered the cost to write the new content for this second edition of the Toolkit and paid to have it produced and printed.

The content of the Toolkit is based on Dr. Rusten's experience working with schools in Indonesia and other countries around the world that are struggling to introduce and sustain the use of computers and Internet connectivity as an important means of improving teaching and learning. Key aspects of the content emerged from his experience with schools that were part of the DBE3 project and those involved in the Wireless Reach initiative. Five of the Wireless Reach schools, listed below, are in rural communities in the Lampung District of Southern Sumatra. The sixth school is in an urban area of Pacitan, East Java.

-
- 1 The term Computer System is used in the Toolkit to describe all computers, software, peripherals and connectivity in the school. This includes computers in the principal's office and those in classrooms and/or in a school computer lab.
 - 2 http://www.qualcomm.com/citizenship/wireless_reach/index.html

Schools that participated in Qualcomm's Wireless Reach™ Project:

Buay Bahuga, Way Kanan, Lampung, Southern Sumatra
Negara Batin, Lampung, Southern Sumatra
Pakuan Ratu, Lampung, Southern Sumatra
Rebang Tangkas, Lampung, Southern Sumatra
Negeri Besar, Lampung, Southern Sumatra
Madrasah Aliyah Salafiyah Tremas, Pacitan, East Java

As part of this project, Qualcomm's Wireless Reach™ provided the schools with computer labs and wireless Internet access. At the end of the first phase of the project, the team from Wireless Reach™ realized that while the schools' leadership, teachers, and students benefited from the computer labs and connectivity, they were not able to sustain these new systems. To address this problem, Qualcomm contracted with AED to work with these schools to help them gain the skills needed to develop and implement sustainability plans. Over two years of work with AED, these schools developed, refined and implemented their plans with increasing levels of success. An external evaluation of this project in December 2010 showed that unlike at the start of the project, the computers in all of the labs are working properly, and each school has implemented a mix of income-earning activities using their labs.³ The Toolkit refers to the experiences of these pilot schools, along with those from other schools around the world.

During the second phase of this Wireless Reach™ project, Qualcomm invited Cisco Corporation to join the pilot and work with these schools to establish local Cisco Networking Academies (CNAs). As a result, these schools are now part of Cisco's Indonesian Networking Academy program. To accomplish this, staff from the six schools participated in a rigorous training-of-trainers program and received ongoing technical support to integrate the CNA into their school's curriculum. Through this program, students at these schools are now able to learn additional hardware and software skills that will enable them to be more competitive job candidates after graduation (see the Annex for more information on CNA).

While information included in the Toolkit is derived from many sources, all opinions and any mistakes or errors are the sole responsibility of the author.

³ Leitch, Darren (December 2010). "Wireless Reach Sustainability Project Final External Assessment Report," AED.

Context and Introduction

Across the world, schools, parents, companies, donor organizations—including USAID Qualcomm, and local and national government agencies—are making significant investments to bring computer technologies and Internet access to schools to improve school management and education quality.

Buying and installing computer equipment in schools is relatively easy; however, using these resources to deliver better education is much more difficult. Additionally, sustaining these expensive investments and expanding access to computers so these investments continue delivering educational value over time is equally difficult. Unfortunately, many schools lack the staff capacity, management systems, or financial resources to sustain and grow these investments. For example, an informal survey of 10 schools in Central Java and five schools in Southern Sumatra revealed that up to 20 percent of the computer equipment that had been purchased over the previous two years was no longer operational.⁴ Also, while some of these schools had received Internet access through projects, nearly all of them had been unable to sustain their connectivity once the projects were over. The situation in these schools is probably similar in most public schools in Indonesia and those in other countries around the world.

To address this critical challenge, the AED team collaborated with Qualcomm’s Wireless Reach™ initiative to develop the *Computer System Sustainability Toolkit* (Toolkit) to be used by school directors, teachers, and parent-teacher groups to develop actionable plans to sustain and grow their investments in computer technologies and connectivity. The Toolkit enables staff members from any public school to improve their capacity to sustain their school’s computer system. While school teams do not need to complete all of the recommended activities to gain some benefit from the Toolkit, the more Toolkit units that school teams complete, the more effective their efforts to sustain their systems will be. Also, some Toolkit activities depend on completing other activities first to gain the greatest benefit. These foundational activities are presented as the first steps toward achieving sustainability.

We have attempted to make the Toolkit useful for any school with one or more computers. We have also attempted to make it possible for any team of educators, students and parents at any school to use the Toolkit and develop useful tools to help achieve sustainability without additional information or skills. This does not mean that team members who seek to create and carry out a sustainability plan will not need to work hard. On the contrary, developing a high-quality sustainability plan and implementing it effectively will require a significant

4 Rusten, Eric (February, 2007), “Assessment of the ICT Situation, Challenges, Opportunities and Options with DBE3 Schools and Education Providers.”

effort by each member of the team, collaboration with all of the students in the school, support of parents, and help from the school's community. The consequence of this effort is that investments in computer technologies at a school will continue to deliver positive educational returns for the leadership, teachers, students, and parents for many years. Additionally, building the capacity to develop and carry out a school technology sustainability plan will deliver dividends in other aspects of maintaining and improving education at the school. It may also be possible for teachers to use the activities in the Toolkit in different subjects at the school to illustrate how the skills they are teaching their students have immediate and practical results in the real world.

Getting Started

The *Computer System Sustainability Toolkit* is designed to help staff, students and parents at schools to gain the skills needed to develop and implement plans to sustain their computer systems. The Toolkit is written so schools can create and implement their plans without any additional external support. In addition, staff of nongovernmental organizations (NGOs) and donor organizations may find the Toolkit useful as they work with schools to help them develop and implement effective sustainability plans for their computer systems. The Toolkit is organized into units and sections that start with questions that users answer as they work their way through the Toolkit. The answers to the questions in one unit are often important to answering the questions in later units.

Why should I use this Toolkit?

All schools that have computers or are planning to buy them need to learn how to keep this expensive and complex equipment working so students and teachers can use these powerful tools every day without difficulty. At the same time, schools that have computers or want to buy them also need to pay the recurrent cost for Internet access, to maintain their system, to repair equipment, and to pay for consumable supplies. The Toolkit will help school principals, teachers, students, and parents develop a plan to maintain the equipment, generate revenue, and sustain and grow their school's computer system.

Who is this Toolkit for?

Schools in countries across the world are installing computers and establishing Internet access in an effort to modernize education and provide their students with opportunities to use these important tools. To support this effort, local and national government agencies, private companies, and donor and parent organizations are funding the initial purchase of these costly systems and often help teachers gain the skills needed to use these tools to improve teaching and learning. Unfortunately, most schools are ill prepared to sustain these costly investments. They rarely have sufficient funds in existing budgets to cover routine maintenance, to repair computers when they break down, to upgrade systems as demand grows, to establish and cover recurrent costs for Internet access, and to buy new equipment to increase student access. The Toolkit is designed to help staff at schools that are either planning to buy computer equipment and establish Internet access for the first time or that already have computers to develop the capacity to sustain and grow their systems. At the same time, the Toolkit is designed for all members of the school community—principals, teachers (not just information and communication technology [ICT] teachers), parents and students—who have a stake in keeping their school's computer system operating and growing. In short, this Toolkit is designed for you!

What does it mean to sustain a school's computer system?

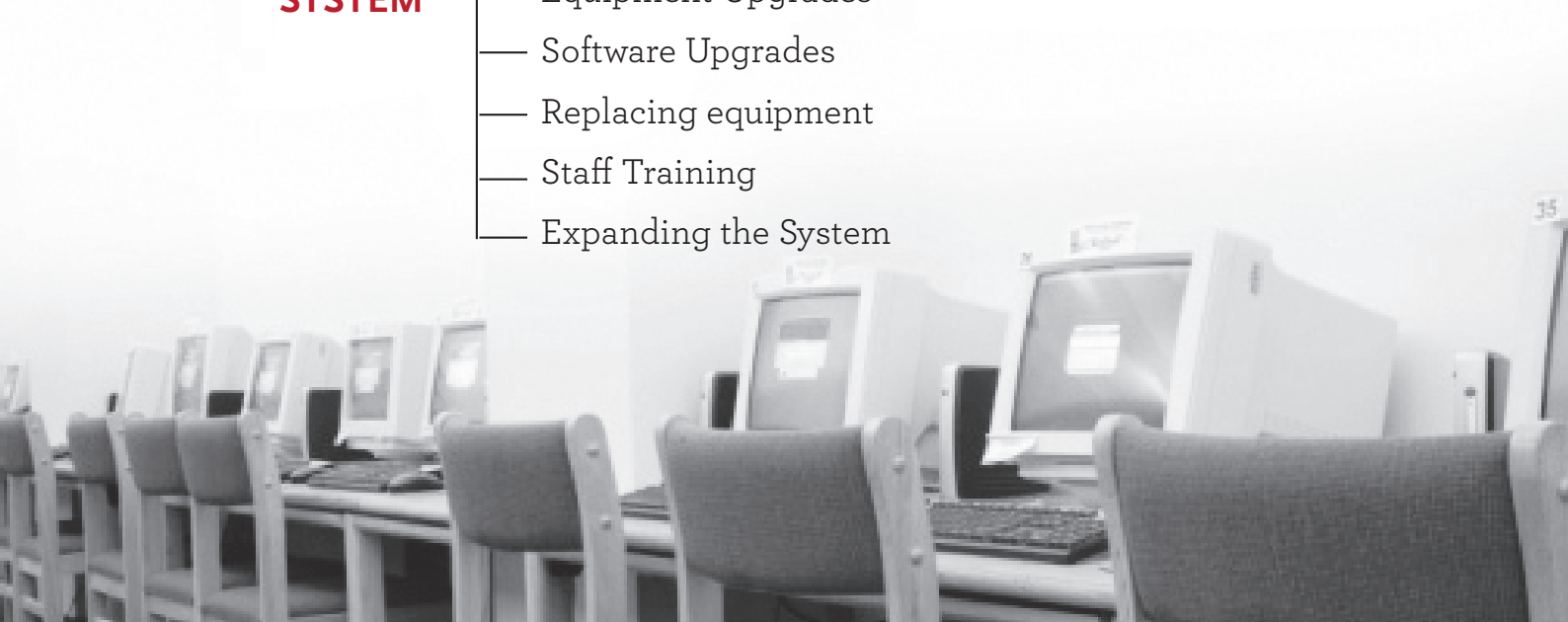
Sustaining a school's computer system involves more than just keeping the computers operating and repairing them when they break down. Sustaining a school's computer system also includes having the funds to pay recurring costs for consumable supplies such as ink, toner and paper for printing, cover the additional costs of electricity (or fuel for a generator), and to pay for Internet access. Sustaining a computer system also involves upgrading equipment and software to meet the growing demands of teachers and students. Finally, sustaining a computer system involves replace aging equipment and buying new equipment to increase the level of access by students and teachers. The Toolkit will help you and others at the schools address all of these aspects of sustaining your school's computer system.

What do schools need so that they can sustain their computer system?

Having enough money to address the different aspects of sustaining a school's computer system is one of the most critical challenges schools face. However, effectively sustaining a school's computer system requires more than money; it requires quality leadership at the school and a well-designed sustainability plan that meets the day-to-day and long-term needs of the system. Also, sustaining a school's computer system cannot be achieved by the principal or the computer teacher alone. It requires broad-based support and commitment from all members of the school community who have a stake in keeping the system running and in growing this valuable asset. This includes the school's administration, all teachers, students and their parents, and other members of the school community. Sustaining a school's computer system also needs skills, such as ICT and education, management and planning, and marketing and business skills. The Toolkit will help you address these needs and to enable you and your staff to gain many of the skills you need to create and implement your school's Computer System Sustainability (CSS) plan.

**SUSTAINING
A SCHOOL'S
COMPUTER
SYSTEM**

- Operating cost
- Repair cost
- Consumable supplies
- Internet access
- Equipment Upgrades
- Software Upgrades
- Replacing equipment
- Staff Training
- Expanding the System



How schools should use the Toolkit

What is included in the Toolkit?

The Toolkit is organized into nine units that will enable you to answer several critical questions and create a sustainability plan for your school's computer system.

UNIT 1: TOOLKIT OVERVIEW: What are the main steps in creating a school Computer System Sustainability (CSS) plan?

UNIT 2: ESTABLISHING YOUR TEAM: How can we establish and manage a Sustainability Planning Team (SPT)? What are the primary goals of the SPT? How should the SPT be organized and operate?

UNIT 3: ESTABLISHING YOUR SCHOOL'S FIRST COMPUTER SYSTEM – PLANNING FOR SUCCESS: Why do we want to establish a computer system or lab at our school? How much money will we need to establish and operate a new computer system? What should we do to prepare our school for a computer system? What computer equipment should we consider buying for our computer system? What software should we get for our computers, and where can we get it? How should the computer lab be configured for quality teaching and learning?

UNIT 4: OBTAINING, OPTIMIZING AND SUSTAINING INTERNET ACCESS: Why should we connect our computer system to the Internet? What are the different ways to connect a computer system to the Internet? Which Internet connectivity options are the best for our school? How can we ensure appropriate and safe use of the Internet in our school?

UNIT 5: EVALUATING YOUR CURRENT COMPUTER SYSTEM: What computer resources are at our school and what is the condition of these resources? What information should we collect about our school's computer resources? What should we do with the data from our school's computer system assessment? How do we, the school administrators, teachers, students, and others, use our school's computer resources?

UNIT 6: CREATING YOUR SUSTAINABILITY PLAN: What do we want our computer system to become over the next five years? How can we learn what community members want our computer system to become in the future? What questions and/or topics should be part of a Focus Group Discussion (FGD)? How should the SPT use the results from the Focus Group Discussions? How much money is the school currently spending to buy computer equipment, provide Internet connectivity, and operate and maintain our computers? How much money do we collect annually to support our school's computer system? How can we maintain our valuable computers without spending a lot of money?

UNIT 7: GENERATING INCOME: How might we use our valuable computer resources to generate revenue to help us maintain and grow our computer system? How should we run our brainstorming session? Are there other ways the SPT can generate ideas to raise the money needed to sustain our computer system? How are other schools raising money and generating income to sustain their computer systems? Are there any really important things we should we keep in mind as we explore using our computer system to generate income? How can we decide which revenue-generating strategies to implement at our school? How can we estimate how much net revenue we may earn for each income-earning strategy? What kinds of things should be included in estimating the total cost of running an income-generating activity?

UNIT 8: MAINTAINING YOUR BUDGET: How can we determine whether our income-generating activities are creating a surplus, and whether the net income is covering the cost to sustain our computer system? How can we promote and diversify our revenue-generating strategies? How can we increase the number of “customers” who buy our services or participate in our fundraising activities?

UNIT 9: MONITORING YOUR PLAN: How do we know if our sustainability plan is working?

How should you use the Toolkit?

You can use these units in any order you want; however, you will get the best results by starting with Unit 1 and moving through the remaining units in order. Along with advice for answering the unit’s questions, some units include examples of how a school might use the information generated by going through the unit’s exercises to create and implement its sustainability plan. Some units also include worksheets you and your team can edit to meet your specific situation and complete as part of your school’s Computer System Sustainability (CSS) plan. As you move from unit to unit, you may need to go back and revise earlier parts of your plan as you collect new information and make new decisions. As with all plans, your CSS plan will need to be updated over time as you implement your plan and your school’s computer system grows and changes. The final unit of the Toolkit advises you on how to monitor and update your plan over time. Each school’s experience with using the Toolkit will be different. The results you achieve from using this Toolkit will depend on the time and effort you and your team invests in developing and implementing your CSS plan and the financial and infrastructural challenges you face. The Toolkit includes a CD on which all Toolkit content can be found along with editable versions of the tools, and templates and three how-to Jing videos.



aventure fâcheuse, désagréable
une mémorable que vous

Le volcanisme.

nuées ardentes
fumées volcan
coulées basses + projections
fragments
andus
ex plosions
tremblement de terre à sec
émissions de gaz solides

COMPUTER SYSTEM SUSTAINABILITY TOOLKIT

UNIT 1:

Toolkit Overview

1



Sustaining a school's computer system involves multiple and interrelated elements. To address each of these requires that you create a Computer System Sustainability (CSS) plan. Having a well-designed plan will guide your school's efforts and give you the best possible chance of sustaining your school's computer system. There are many possible steps in developing a good sustainability plan; the Toolkit will take you through the following main ones:

- **Creating a team** of dedicated people to take the lead in developing and implementing your school's CSS plan.
- **If you do not yet have a computer system at your school**, the Toolkit will help you decide which equipment you need, how to prepare your school for your new computer system, how to arrange the computers in your lab and what it may cost to establish your new computer system.
- **If you do not yet have access to the Internet at your school**, the Toolkit will help you learn about the different ways that can be used to access the Internet, determine which ways are available to you and plan how to manage the use of the Internet at your school.
- **Assessing the current state** of your school's computer system.
- **Learning how teachers and students use the school's computers and how much money is spent on the school's computer system.** What types of computer equipment and related resources members of the school community want to be part of the school's computer system over the next five years.
- **Establishing a low cost means** to improve the performance and to maintain your school's current computer system.
- **Brainstorming with the team on how your school can raise the funds** needed to cover the costs of sustaining the school's computer system, and how the computer system might be used to generate revenue.
- **Selecting and implementing** the best revenue-generating plans.
- **Developing and using a budgeting tool to track expenses** to run and maintain the computer system, project income from different revenue-generating strategies, and manage the revenue the school's computer system earns.
- **Monitoring the implementation** of your school's CSS plan and updating and revising the plan over time to improve sustainability and the benefits the teachers, students and community gains from your computer system.

The following Checklist can help you and your team track your progress in completing these steps toward creating and implementing your school's sustainability plan.

CHECKLIST FOR MAJOR MILESTONES TO BE COMPLETED

Major Milestones	Start Date	Complete Date	Check (✓)	Notes
Develop and distribute SPT statement of purpose (Unit 2)				
Select SPT members (Unit 2)				
Determine Total Cost of Ownership of new or expanded computer system or lab (Unit 3)				
Assessment of internet connectivity options for your schools (Unit 4)				
Organize a school-community meeting to discuss internet connectivity (Unit 4)				
Assessment of school's computer system (Unit 5)				
Assessment of teachers, students and community usage of computer system (Unit 5)				
Develop CSS Plan (Unit 6)				
Set up SSTC (Unit 6)				
Compile computer equipment expenditure report (Unit 6)				
Hold fundraising ideas contest (Unit 7)				
Decide on fundraising ideas (Unit 7)				
Estimate the cost of running an income generating activity (Unit 7)				
Develop cost and revenue tracking system (Unit 8)				
Advertise events, trainings or activities (Unit 8)				
Develop monitoring and evaluation strategy for CSS plan (Unit 9)				
Update your CSS plan based on your findings (Unit 9)				

This is a suggested list of major milestones that you may want to keep track of while using the Toolkit. Feel free to add your own milestones to the list as well. An editable copy of this Milestones table is available on the Toolkit's CD. You can modify this table to suite your school's situation and print it so that you can check off the different tasks as you complete them.

COMPUTER SYSTEM SUSTAINABILITY TOOLKIT

UNIT 2:

Establishing Your Team

2



Selecting the right mix of people with the experience, interest and time to participate is essential to the success of the Sustainability Planning Team. This unit will help you select, organize and inspire a well-balanced team at your school to manage the process of creating and implementing your CSS plan.

How can we establish and manage a Sustainability Planning Team (SPT)?

The best CSS plans are created and implemented by a team comprising men and women who are representative of your school and the surrounding community. This does not need to be a completely new team or committee; it can be developed from an existing team that is working to improve the school's performance and infrastructure. However, based on experience from schools around the world, and from the six Indonesian schools that pioneered the development of this Toolkit, a successful SPT should be broadly representative and include the following members:

- the **principal and another member of the school's administration**, preferably the school's bursar or finance officer;
- at **least three teachers** (men and women unless your school is only for boys or girls and only has men or women teachers) representing different disciplines—not just the ICT teacher;
- at **least three students**, boys and girls, (unless your school only has boys or girls) who are selected by the student body to represent its interests;
- at **least three representatives**, men and women, from the school's parent-teacher association (PTA) (or three parents if



the school does not have an active PTA); and

- at **least two local business owners** from the community.

What roles will the SPT member have?

Each member of the SPT will play many important roles, including: a) being an active participant in the SPT; b) representing the interests, concerns, and needs of his or her constituents; c) communicating the work being done by the SPT to his or her constituents; and d) mobilizing his or her constituents to help implement different aspects of the school's CSS plan. It is important to select team members who can carry out these responsibilities and remain active members of the team for a full school year. The amount of time required by SPT members depends on the size of

It Takes a Team

The best CSS plans are created and implemented by a team comprising men and women who are representative of your school and the surrounding community.

SCHOOL
ADMINISTRATION

TEACHERS

PARENTS

LOCAL BUSINESS
OWNERS

STUDENTS



your school, the complexity of your school's computer system, and the goals the team decides to achieve. Experience from schools in Indonesia and elsewhere shows that SPT members may need to spend four to eight hours a month with routine meetings. Some members will need to spend more time depending on the different sustainability plan activities that they either lead or participate in.

Do SPT members need to be computer experts?

It is not necessary for each member of the team to have extensive knowledge about computers, but all members should be interested in learning about computers and, most important, in helping the school build a self-sustaining computer system. At least one member of the team should have some knowledge about and experience with computers. If your school has a computer teacher, staff member, or volunteer who is responsible for managing and/or maintaining the school's computer system, he or she should part of the SPT.

The above suggestions and those that follow are based on experience with successful SPTs at schools in Indonesia and in other countries around the world. While each SPT is similar in many respects, it is also different since it reflects the school's local culture and norms. Not all SPTs are equally effective. The skills, experience, and commitment of the team members will determine, to a great extent, how effective your SPT will be. Also, experience shows that over time, teams become more effective as they gain new skills, as their members get to know and trust each other, and as they start to make substantive progress toward creating their CSS plan.

What are the primary goals of the SPT?

Before selecting people to become active

members of the SPT, it is important to provide candidates and the larger school community with a written statement about the purpose of the SPT and the responsibilities members of the SPT will have.

The following page has a sample statement of purpose from a hypothetical school. You can use this sample to create your own statement of purpose using the worksheet, titled **SPT's Statement of Purpose**, which you will find on the accompanying CD, along with all other Toolkit documents. It is important to distribute this statement of purpose to teachers, students, parents, and members of the local business community. This will help raise their awareness of the school's efforts to improve the quality and performance of its computer resources by creating and implementing a CSS plan. This will also raise the profile of the SPT so people with the necessary skills and commitment will want to participate. Also, distributing your SPT's statement of purpose will demonstrate to the school community your commitment to transparent communication.

Furthermore, this will help members of the community start to understand that creating a self-sustaining school computer system depends on the participation of all stakeholders, not just the principal and the ICT teacher. Over the course of the school year, the SPT will need to ask members of the larger school community to contribute time and possibly money to the school's efforts to create the plan and, more important, to implement the plan's strategies and activities. Starting a broad-based communication effort with this statement of purpose and continuing with ongoing communications will make it easier for the SPT to secure the active support from the larger school community.

Sample:

Sustainability Planning Team's Statement of Purpose

Dear Friends and Colleagues,

The Whitmore Secondary School is establishing a Sustainability Planning Team (SPT) that will be responsible for developing and implementing a Computer System Sustainability (CSS) plan for our school's computer system. The SPT will be made up of at least 13 volunteers from the school staff, students, parents, and other members of our school community. The mandate of this team is to work together, using the Sustainability Toolkit, to enable the school to build, sustain, maintain, and grow our computer system so it can provide ongoing educational benefits to our students, teachers, and school community.

Members of the SPT do not need to be computer experts. The most important criterion for being selected to join the SPT is your commitment to helping the school improve its educational services by creating a self-sustaining computer system. I am pleased to report that our school's ICT teacher, Ms. Smith, has already agreed to be part of the SPT and provide expert knowledge about our computer system and the technical requirements for sustaining our present system and increasing its capacity over time.

I, the school's principal, will also be a member of the SPT, along with Mr. Reid, the school's finance officer (bursar). To complete the SPT, we will recruit two other volunteers from the teaching staff who will represent non-ICT disciplines. We will also recruit three student volunteers to represent the three upper grades at Whitmore Secondary School. To complement the staff and student SPT members, we will recruit three parents from our Parent-Teacher Association and two members of the business community surrounding the school. The members of the SPT should be recognized as dedicated members of the school community.

During the first few months of operation, the SPT will meet once a week and meetings are expected to last at least one hour. Once the team is established, we will determine the day and time we will meet each week, and we will prepare a calendar for the first three months of the SPT's activities so members can schedule their responsibilities. During our first meeting, we also will establish the rules that will govern our meetings and elect members of the team to chair the meetings and keep records. Later, as the team's tasks are defined, different members will take leadership roles for different activities and tasks. The team will use the Sustainability Toolkit to guide its work and lead us through the process of, first, developing a Computer System Sustainability plan, and then implementing and monitoring the plan during the school year. We expect the plan to be fully operational during this school year.

Each member of the SPT will have the following main responsibilities: a) be an active participant of the SPT; b) represent the interests, concerns, and needs of his or her constituents; c) communicate the work being done by the SPT to his or her constituents; and d) mobilize his or her constituents to help implement different aspects of the school's CSS plan.

HELPFUL HINT



Download a fully customizable version of this sample from the accompanying CD-ROM.

Over the first three to four months of operation, the SPT will engage in the following main activities:

- 1) Assess the current state of our school's computer systems, how teachers and students use the school's computers, how much money the school spends on the school's computer system and what types of computer equipment members of the school community believe should be part of our computer system over the next five years.
- 2) Establish a low-cost means to improve the performance of and maintain the school's current computer system.
- 3) Brainstorm on how the school can raise the funds needed to cover the costs of sustaining the school's computer system, including how the computer system might be used to generate revenue.
- 4) Select and implement the best revenue generating plans.
- 5) Develop and use a budgeting tool to track the costs involved in running and maintaining the computer system, projecting prices for different revenue-generating strategies, and managing revenue earned from the school's computer system.
- 6) Monitor implementation of the school's CSS plan and updating the plan over time to improve sustainability and the benefit the school gains from our computer system.

Over the next two weeks, I will approach active and dedicated members of our teaching staff and members of our school's community to ask them to join the SPT. If you would like to be considered for this important team, please contact me directly so we can add your name to the list of SPT candidates. The teaching staff will also organize the election of students from each of the three upper grades at the school to join the SPT. As part of this process, we will identify boys and girls from each of these grades whom we feel should run in the election to represent their grade in the SPT. Ultimately, we will strive to create a team that includes a balanced number of men and women.

I am excited at the opportunity to work with a dedicated team of concerned educators, students, and other members of our school's community to help improve our school by enabling us to sustain and grow our computer resources. I am sure that our efforts will strengthen our school and provide our students and teachers with continuous access to computer technologies and the Internet as an important means of preparing them for a positive and productive future.

Alex Robinson

Principal of Whitmore Secondary School

How should the SPT be organized and operate?

Once you have identified the members of the school's SPT and secured their commitment to participate actively in all SPT meetings and activities, you will need to organize the first meeting. At this meeting you and the other members of the team will need to achieve several important objectives. The following is a list of suggested objectives, which you should use to create the agenda for your first meeting using the Toolkit form, titled **First SPT Meeting Agenda**. A template of this form can be found at the back of the Toolkit and on the accompanying CD.

Suggested Objectives for Your SPT's first Meeting

Getting to know each other – All members of the SPT probably will be somewhat familiar with each other. However, since you want them to work well with one another, you will want to organize an activity that enables the team members to learn more about each other and understand why each one wants to be part of this team.

One enjoyable way to achieve this is to organize the team members into pairs, making sure to link each member with someone outside of his or her peer group. For example, a teacher might be linked with a parent, a businessperson with a student, and a student with an administrator, etc. Next, ask each member of the pair to interview the other as if he or she is a reporter for a local newspaper or radio station. The "reporter" will then have to deliver a report on the results of the interview to the rest of the SPT.

Before starting this exercise, have the whole group brainstorm about the questions that should be asked during the interview. This will ensure that each team member will share

common set of information with the group. Below are some good questions for the interview activity that you and the team members may want to include.

- What is one thing about you that the members of this team may not know?
- Why did you want to be part of the SPT?
- Which of your skills, experiences, and knowledge do you think will be especially important to enable the SPT to achieve its objectives?
- What do you expect to learn as a member of the SPT?
- Do you believe that computers and the Internet are important resources for quality education at our school? Why or why not?

Creating an effective team structure and

defining the team's core functions: All teams need to have some type of structure to run meetings effectively, define the team's routine activities, keep track of the team's proceedings, communicate progress toward stated goals, and carry out the team's different tasks and activities. One important element of an effective team is to identify a person or persons to be responsible for preparing the agenda for the meetings and to chair the meetings. Some schools select the principal to organize and chair the meetings of the SPT; others create a rotational system where a different member of the team organizes and chairs each meeting. Regardless of the system you choose, it is important to build a strong sense of ownership by all members to ensure effective functioning of the SPT. A strong sense of ownership is encouraged through authentic participation in the meetings and in making decisions. If you use a rotational system, more-experienced members of the team should chair the first few meetings

Sample: First SPT Meeting Agenda



Date:



Time:



Meeting called by: School Director



Proposed Participants:

School Director ICT Teacher Teacher #2
 Teacher #3 Student #1 Student #2
 Student #3 Parent #1 (PTA member) Business Leader
 Administrative Staff School Finance Officer/Accountant



Proposed Agenda Items:

TIME	TOPICS
Topic #1 – School Director	Welcome and Introduction to the Sustainability Planning Team (SPT): a) Getting to know each other activity b) Roles and responsibilities of the SPT; c) SPT meeting schedule; and d) Defining the goals and objectives for the SPT and the school's sustainability plan.
Topic #2 – School Director	Step-by-step overview of each unit in the Computer System Sustainability Toolkit
Topic #3 – School Director	Establishing the different SPT committees (3 members per committee): a) b) c)
Topic #4 – School Director	Prepare an initial calendar of main SPT activities for the year
Topic #5 – School Director	Assign responsibility for the SPT's first task: a) Carry out a detailed assessment of the school's computer system
Topic #6 – School Director	Any additional business that SPT members may have
Topic #7 – School Director	Set a draft agenda for the next meeting, including topics, roles and responsibilities



Additional Instructions:

Establish rapport through activities that allow team members get to know each other



so less-experienced members of the team will learn what needs to be done. Teams often choose the rotational system because it distributes the work of organizing and chairing the meetings among all members equally, ensures participation, and results in all members feeling that they are important members of the SPT.

In addition to identifying someone to organize and chair the meetings, the team will need to decide on an effective way

of maintaining a record of each meeting, especially of all decisions made and the assignments for different activities that are made. This documentation should be shared with the larger school community so all stakeholders can be kept informed about the SPT's progress toward creating and implementing the CSS plan. The meeting records will also make future meetings more effective, and the team will be able to make good progress toward achieving its objectives.

During future meetings, the team will need to assign members to take leadership roles for different activities outlined in the Toolkit, which will enable the team to prepare and implement the CSS plan.

Reviewing the contents of the Toolkit: All SPT members will need to become very familiar with the Sustainability Toolkit and the different core activities the team will carry out to create their school's CSS plan. If possible, the school should make copies of sections of the Toolkit (the Toolkit's CD includes a digital copy of the Toolkit for printing) for each member of the team so he or she will be able to study the content and bring copies to each SPT meeting. After the copies of the Toolkit are distributed to each team member, we recommend that the principal and the ICT teacher (if the school has one) provide a brief overview of the different units so team members have a general understanding of what they will be engaged in over the school year. They should also encourage the members to read the statement of purpose letter again so they gain a detailed understanding of the team's responsibilities.

Preparing a calendar for future SPT

meetings: We recommend that, for the first three months of the school year, the SPT meet once a week so the team will be able to make rapid progress on developing the school's CSS plan. You can use the **SPT**

Calendar Template in the Annex and on the CD, along with the sample on the following page, to help with this process. The goal is to create a draft plan within the first quarter of the school year so the team will have the rest of the school year to implement different parts of the plan. This will enable the school and the team to start experiencing the benefits of their CSS plan quickly. Each team meeting will likely last one to two hours,

depending on what needs to be accomplished and what decisions need to be made.

Assigning responsibility for the team's first

task: Which activities need to be done first will depend on whether your school has an existing computer system or is exploring establishing a computer system for the first time. If your school has a computer system, then one of the first tasks in developing a quality CSS plan is having a clear understanding of the status of the school's current computer system. This is accomplished by carrying out a detailed assessment of the system (see Unit 5 for details on this task). We recommend that at least three members of the SPT be responsible for carrying out this task and preparing an assessment report on the state of the school's current computer system for a future team meeting. The assessment team might include the school's ICT teacher, one student and one parent. If your school is exploring establishing a computer system for the first time, then the SPT will need to work on Unit 3.

Any other business: The acting chair may want to ask members to suggest any other business to discuss before the meeting is closed.

Next meeting: The acting chair may wish to confirm the date, time, location, and, if necessary, the chair of the next meeting.

As you are probably starting to understand, establishing an effective SPT and creating a CSS plan are not simple tasks. However, the results of your efforts to enable your school to create a self-sustaining computer system, improve the performance of this system, and increase student and teacher access to computers and the Internet at your school will make your hard work worthwhile.

Sample: SPT Calendar

Month	Week 1	Week 2	Week 3	Week 4
September	School year begins	Develop SPT statement of purpose (Unit 2)	Distribute SPT statement of purpose	Select SPT members
October	Hold first SPT meeting	Determine total cost of ownership of new computer system (Unit 3), or Carry out detailed assessment of the school's computer system (Unit 5) Conduct computer usage surveys SPT MEETING	Create summary report of assessment Compile the results of the computer usage survey SPT MEETING	Distribute summary assessment report to community Assess internet connectivity options for your school (Unit 4) SPT MEETING
November	Organize focus group discussions (Unit 6) SPT MEETING	Focus group discussions take place	Summarize wish list mentioned by focus groups SPT MEETING	Present wish list to SPT Brainstorming session on fundraising ideas SPT MEETING
December	Rank and select the best fundraising ideas (Unit 7) SPT MEETING	Present draft CSS plan to the SPT for review and comment SPT MEETING	Refine CSS plan draft SPT MEETING	Break
January	Break	Review final CSS plan SPT MEETING	Present final CSS plan to community	Develop cost & revenue systems (Unit 8) SPT MEETING
February	Begin implementation of selected fundraising ideas	 SPT MEETING		Develop monitoring & evaluation strategy (Unit 9) SPT MEETING
March		Review and finalize M&E strategy SPT MEETING		Implement M&E strategy SPT MEETING
April		SPT MEETING		SPT MEETING
May	Update M&E tracking form	Create comprehensive M&E summary SPT MEETING		Review M&E summary and update CSS plan SPT MEETING
June	School event to share results of M&E summary and plans for next year		School year ends	
July				
August				



Important items to remember:

1. Computer System Assessment, 2. Focus Group Discussions, 3. Brainstorm & select fundraising ideas, 4. Develop CSS plan, 5. Develop cost & revenue systems, 6. Develop monitoring and evaluation strategy

UNIT 3:

Establishing Your School's First Computer System: Planning for Success

3



This unit will help the leadership and staff at schools that do not yet have a computer system or lab make decisions about establishing a new computer system at their school. This unit may also be useful for SPTs at schools that already have computers and are thinking about buying more computer equipment or establishing additional computer labs. If your school already has a computer system and you are not considering expanding it at this time, you may wish to skip Unit 3 and jump to Unit 4.

Why do we want to establish a computer system or lab at our school?

This is an important question for the SPT to discuss and answer. At first, the answer to this question may appear to be simple. Members of the SPT may answer, “Yes, we should establish a computer system at our school.” However, before you jump to this conclusion, it is important for you and the SPT to consider, discuss, and answer a few other related questions. Going through the following questions will help you and your SPT carefully consider the consequences of deciding to establish a computer system or lab at your school. Because of the importance of these discussions, you should plan for two to four hours for the first meeting on this unit.

To facilitate the discussion of these questions, you may want to divide the SPT into two or three smaller groups, and then ask each group to discuss and answer the questions below. To make the process efficient, you should tell each group to spend a specific amount of time discussing and answering each question. Each group should have one person record the most important points of the discussion and the final answer. Periodically, to make the meeting progress

effectively, you may want to stop the small group discussions and have each group briefly present the main points and answers to the questions its members have discussed.

The questions that follow should help you determine if your school should establish a computer system or lab. Before starting the discussion, it would be helpful to present this list of questions to the SPT and ask if the members would like to add any other critical questions for discussion. Once you have a final list, you can start the discussion process.

Proposed discussion questions:

1. What are the most important reasons for establishing a computer system or lab at our school? What specific benefits, educational and other, do we expect to gain by establishing a computer system or lab at our school?
2. How much money will we need to establish a quality computer system or lab (buy, install, and secure the equipment) and operate it for the next five years? Do we have the staff with the skills needed to establish the computer system or lab and operate it? If not,

where will we get help, and what will it cost to select and buy the equipment we will need, prepare the school and classroom for the lab, install all the hardware and software for the new system, and operate the new computer system?

3. Do our teachers and other staff have the skills needed to use the computers and other equipment, integrate the use of these computers to enhance the teaching of subjects that make up our curriculum, and manage and maintain the computer system? If not, what will we need to do, and how will we do it, to build and strengthen the skills of our teachers to use and manage this new computer system?
4. Where in the school will we establish our computer system or lab? What classroom or other school building will we use for our new computer lab? Will the room with the computer system or lab be used for teaching other subjects, or will it be used exclusively for using computers? If we don't have an existing classroom for the lab, where can we build one?
5. Will the computer system or lab be made available to members of the community to use during non-school hours? If yes, what will need to be done to make it possible for community members to use the new computer system or lab during these hours?

This initial discussion will help you and the other members of the SPT decide whether or not to establish a computer system or lab. The following sections of this unit will help you and the other SPT members to continue these discussions and refine your initial answers to these questions.

How much money will we need to establish and operate a new computer system?

At first this question may seem relatively easy to answer. All you need to do is determine the cost of one computer, and then multiply it by the number of computers you think you will need for your new system or lab. For example, you may determine that a suitable new desktop computer from a local store costs the equivalent of US\$835, and you think you will need 10 or 20 computers for your computer lab. Therefore, it would cost US\$8,350 - \$16,700 to establish your school's new computer lab. Unfortunately, buying the computers is only one of several expenses you will need to consider when determining how much money you will need to establish a computer system or lab at your school. The following table, and the accompanying spreadsheet on the Toolkit's CD, includes other types of expenses you will need to consider when determining the total cost of establishing and operating a new computer system or lab at your school. This is often called the Total Cost of Ownership (TCO), which is discussed in greater detail below. While some of the costs may be zero (for example, the government or a donor organization may donate the computers) or very low, it is important for planning purposes to consider and include each of the cost categories presented below. Because each school's situation is unique, you and other members of the SPT may need to add other cost elements to this table and the accompanying **Cost Estimate Template** on the CD.

As shown in this table, the total cost to establish and operate a computer system at your school may be significant. Because of this, it may be necessary for you and the SPT to consider ways you can use your computer system to generate revenue to cover management and maintenance costs

COST ESTIMATE

NO.	DESCRIPTION OF COST ELEMENTS	UNIT COST (US\$)	UNITS	TOTAL COST (US\$)
1	Computers (desktops, laptops or other types) for students and teachers to use.			
2	One or more computer servers to provide file sharing and networking services.			
3	One or more printers for the computer lab.			
4	Other computer hardware such as a scanner, uninterruptable power supplies, surge protectors, digital cameras, web cams, etc.			
5	One or more data (LCD/DLP) projectors for the computer lab.			
6	Networking hardware to connect the computers together to form a network to share files, printers and access the Internet.			
7	Shipping the equipment to the school.			
8	Installing and configuring the equipment and software so the system is working properly.			
9	Software for the computers including: a basic office suite, antivirus/antimalware, utilities, education management software, and other special educational software.			
10	Furniture for the new computer lab to make it possible to use the computers effectively.			
11	A room for the computer system or lab, either an existing classroom or new room built for the lab.			
12	Refurbishing an existing room that will be used for the new computer system to prepare it to house and operate the computer(s) and to keep them safe and secure. This may include increasing the number of electrical outlets in the room, improving the room's lighting, providing an air conditioner, leveling the floor, repairing windows, adding metal security grills to the windows and the door, etc.			
13	The estimated cost for electricity to operate the computers and other equipment in the lab. This may be the actual cost of the electricity, of diesel to run a generator, or to buy and install a solar-powered system to generate the electricity needed to operate the new lab (to calculate a cost estimate for the electricity the new computer system will use, follow the instructions in the text box below).			
14	The estimated cost of consumables, including ink/toner and paper for the printer, blank CDs, upgraded software, antivirus updates, etc.			
15	The cost to establish a connection to the Internet. This may be as simple as buying a modem and the cables needed to get connected. It can also require buying and installing a satellite dish. You will need to contact the local or national Internet service provider to learn about the different options and their costs for obtaining Internet access. Unit 4 will guide the SPT through the process of determining the cost of Internet access.			
16	The monthly fee for Internet access. Some service providers charge by the amount of data that is downloaded and uploaded each month; others charge a flat fee regardless of use.			
17	Hiring new staff to manage and maintain the computer system or lab and teach students and teachers to use it.			
18	The cost to provide staff with initial training to use the computers and other equipment and integrate use of the computer system into routine teaching and learning activities.			

and recover the system's recurring costs. Unit 7 will help you and the SPT identify ways to use your computer system to generate income to meet ongoing operational costs.

What should we do to prepare our school for a computer system?

There are three basic physical arrangements often used to establish a computer system in schools to improve education: 1) distribute the computers across multiple classrooms in the school; 2) install the computers in one room to create a computer lab; or 3) use a mobile computer cart with laptops that can be moved from room to room or have students bring the laptops from the cart into their classroom. Some schools use two or three of these approaches.

Regardless of which strategy you and your team selects, the SPT will have to prepare your school for the new computers. As you plan for your new computer system, you will need to consider the following main preparation efforts:



Girls in a school in Amman, Jordan collecting laptops from a computer cart for use in their classroom.

- Improving the physical infrastructure of the school in one or more rooms. This may include increasing the number of electrical outlets in rooms, upgrading the electrical supply, installing network cables, improving security in rooms where the computers will be placed, taking steps to reduce the level of dust in rooms with computers, buying new furniture to provide suitable work surfaces for students to use the computers, improving classroom lighting so computers can be used during the day and at night, etc.
- Building and strengthening the capacity of all teachers to use the computers to help manage classrooms, prepare lessons, and integrate the use of the computer system into their classroom teaching.
- Establishing a schedule for using the computer system that will provide equitable access by all students and teachers.
- Informing the students at the school about the new computer system and how it will be used to improve teaching and learning and about their responsibilities to help maintain and sustain this valuable asset.
- Informing the parents and members of the community about the new computer system and how they may have access to this important community asset.
- Reorganizing the school's budget to include additional line items to cover ongoing expenses related to maintaining and sustaining the computer system.
- Carrying out additional activities described in other units of the Toolkit to enable your school to sustain and grow this important educational resource.

Estimating the Cost of Electricity

1. The first step to calculate the total amount of electricity that your computer equipment will use is to look at the small sticker on the back or bottom of each piece of equipment (see diagram below) and record the voltage (volts) and amperes (amps) that each device uses. Multiply these two numbers together to calculate the amount of watts of power each device consumes. For example, a typical laptop power supply uses 20 volts and 4.55 amps of electricity to operate and therefore it takes 91 watts of power ($20 \text{ volts} \times 4.55 \text{ amps} = 91 \text{ watts}$) to operate the laptop. Add up the number of watts consumed by each piece of equipment to determine the total watts for all the equipment that will be part of your system.
2. Calculate the number of watts that all of the equipment will consume in a typical day. To do this, first multiply the total number of watts used to operate all of the equipment in the lab by the average number of hours you expect that the equipment will be used in a typical day. Remember, some equipment may remain on the entire school day and other equipment may remain on for 24 hours a day. Since this probably will be a very large number, you can convert the number of "watt hours" to "kilowatt hours" by dividing this by 1,000 (1,000 watts in a kilowatt). For example, if I use my laptop for 13 hours on a typical day, it will consume 1,183 watt hours of electricity each day ($91 \text{ watts} \times 13 \text{ hrs} = 1,183/1000$) or 1.83 kilowatt hours each day.
3. Calculate the number of kilowatt hours of electricity used in a typical year by multiplying the above number by the total number of school days you expect the equipment to be used. Remember, if you expect members of your community to use your new computer system in the evenings and on weekends, you will need to include these times in your calculation. For example, I estimate that I use my laptop six days each week or 312 days in a year, so I will consume 570.96 kilowatt hours of electricity to use my computer for a year.
4. Finally, determine the cost per kilowatt hour your school pays for electricity. This should be included on the school's electric bill. If a central authority pays for the school's electricity, you can substitute the cost you pay for a kilowatt hour of electricity at your home. For example, in Rockville, Maryland, in the U.S., I pay US\$0.16 per kilowatt hour of electricity (total charge for electricity on a monthly bill divided by the number of kilowatt hours consumed that month). If you generate electricity at your school with a diesel or gas generator, multiply the cost of fuel to run the generator each hour by the number of hours a year the generator will be needed just to operate the computers.
5. Finally, calculate the estimated total cost of operating your computer system each year by multiplying the cost per kilowatt hour by the total number of kilowatt hours of power consumed each year. For example, it costs me about US\$91.35 per year ($\$0.16/\text{KwH} \times 570.96 \text{ kilowatt hours per year} = \text{US}\$91.35/\text{year}$) to operate my laptop computer. Select the voltage rate that is appropriate for your country (most countries use 230V for their standard voltage). Then multiply that number by the appropriate amperes (found to the right of "A" and highlighted by the second yellow arrow). If your country uses 230V, you would select the second of the two amp rates. Therefore, multiplying 230V times 3.0A would tell us that it takes 690 watts of power to operate this computer.



The example above was found on the bottom of a desktop computer. The voltage is found to the right of the "V" highlighted by the first yellow arrow.

What computer equipment should we consider buying for our computer system?

Even though computers and related equipment have come down in price over the last few years, buying a large number of computers to enable your students and teachers to have effective access will be a major expense. Establishing your computer system may even be the single largest capital investment your school will make. While the initial cost to buy equipment, purchase software, prepare your school for the computer system, and train your staff to use these new tools will be high, this initial cost probably will be less than the ongoing costs over three to five years to maintain and sustain the computer system, pay for the electricity to power these new tools, buy consumables to support the use of the computer system, and secure the system against theft and damage. When you combine the cost to purchase the equipment and establish the computer system at your school with the cost for operating, maintaining, and sustaining the computer system, you will determine your computer system's **Total Cost of Ownership (TCO)**. It is critically important to estimate the TCO when you are evaluating and comparing different equipment options. The computer with the lowest price in the store may end up being much more costly to operate, maintain, and sustain over time than more expensive alternatives, so when you ask different equipment vendors for price quotes, you also need to have them estimate the TCO for the equipment they are recommending. In your request for quote, you should also emphasize that your purchase decisions will be based on the TCO, not just on the initial purchase price.

Experience shows that many equipment vendors and computer shops will not be very concerned about your school's TCO

for the equipment they recommend. They will be more concerned about selling you equipment they have in stock. Also, many of their customers are only concerned with paying the lowest prices for the equipment, so vendors may be unprepared to answer your questions about TCO. However, since this is your school's precious money, you will want to base your purchase decisions on the TCO, not just on the lowest initial purchase price. The following parts of Unit 3 will help you and your SPT evaluate the TCO for different computer equipment options.

In addition to considering the TCO in making your decision about which equipment to purchase for your computer system, it is equally, if not more, important to keep focused on the educational and classroom management objectives you expect to achieve by establishing a computer system. These educational objectives should drive your computer purchase decisions, not technical specifications. The technical aspects of the equipment, the type of computer chips that are used, the processing speed, the gigabytes of memory and storage, and the number of "bells and whistles" that are part of each piece of equipment should not be the primary focus for your purchase decisions. Computers and other equipment are just tools; it is more important to know what you will be able to achieve by using these tools rather than what these tools are.

Another way to think about this is to imagine going to a restaurant for a special occasion: the chef will be much more concerned with the quality of the meal he or she is preparing than with how special his or her pans and stoves are. For the school, it is much more important to focus on the educational and classroom management results you want to achieve with your computer system than to focus on the specifications of the equipment.

At the start of Unit 3, you and your team discussed why you want to establish a computer system at your school. This assessment should enable you to define the educational and management objectives you want to achieve by establishing a computer system at your school. At this point in the Toolkit, you may want to revisit these initial questions with your SPT and refine your school's objectives. The clearer everyone is about what your educational objectives are, the better choices you will make about which equipment to buy. You should use your objectives, along with the TCO, to decide which equipment options will enable you to achieve your educational objectives and provide the lowest TCO.

Which types of equipment should we buy?

The following section of Unit 3 will assist you and your SPT to identify and evaluate different equipment options for your school's computer system. The Toolkit will not tell you what equipment you should buy. One reason for doing this is that the types, brands, and options available in the technology marketplace change rapidly. Any recommendation for a specific brand or a set of specifications would be out of date in a few months. Also, not all types and brands of equipment are available in all locations and countries. Furthermore, each school's educational and school management objectives, along with its specific context, create a unique situation for which there is no single recommended equipment.

However, the Toolkit will provide you and your SPT with some general information about different types of equipment options to consider when making decisions about the characteristics of the computer system you will establish at your school. This overview is organized in three sections: 1) computer choices; 2) networking choices,

Total Cost of Ownership

Some key elements to determining the total cost of ownership and use:

- Buying the right equipment—initial costs;
- Beyond opening the box—cost to transport and install the equipment;
- Paying for new or used donated equipment—the cost of getting the donation, refurbishing and upgrading used equipment for use in your school and the cost to maintain the donated equipment;
- Preparing school infrastructure—the costs to build or refurbish a room and school building to use and keep the equipment secure;
- Operating the equipment—energy costs;
- Software and software upgrades—initial purchase/upgrade costs;
- Getting everyone ready—training costs;
- Managing the system—cost of support staff;
- Keeping the system operating—technical support and maintenance costs;
- Getting and staying connected—Internet connectivity costs;
- Sustaining and expanding your system—investing in sustaining and growing your system; and
- Computers don't last forever—planning for replacement costs.

and 3) peripheral choices (software choices will be discussed in the next section of Unit 3).

Computer Choices: When you walk into almost any computer store or visit a computer vendor's website, you will encounter multiple choices of brands, models, specifications, features, and "special deals." It can be very confusing and, if you have not determined your objectives for the computer equipment you want to buy, you will be even more confused. To a great extent, the many variables in the computer marketplace are designed to confuse you. If you are confused, then it is easier for a salesperson to convince you that a specific model is best. Fortunately, the Toolkit will

help you cut through the clutter and be prepared to deal with your local computer store or equipment vendor. When this version of the Toolkit was written, there were four broad categories of computer systems commonly used in schools: a) desktops; b) full-featured laptops; c) netbooks; and d) thin client systems.⁴

Full featured desktops include two general types of systems. In one, the computer “box” or CPU (central processing unit) is separate from the computer screen. Another type combines the CPU and the screen into a single unit, or an all-in-one desktop solution. In both of these types, the keyboard and mouse are also usually separate units. Desktops that are based on computer chips from Intel Corporation or AMD (the two major manufacturers of computer chips for personal computers) and Microsoft or Linux operating systems (OS)⁵ are the most common types of computer systems in the world. Computers based on Intel/AMD chips and Windows OS are often referred to as WinTel systems. Another company, Apple, also makes computer systems based on Intel chips and the Apple operating system. Unlike WinTel systems, which are manufactured by many different companies, Apple is the only company that is allowed to make Apple computers. As a result, Apple only has about a 7 percent share of the

⁴ There are a number of other variations, but these four types are most commonly available.

⁵ A computer’s operating system (OS) is the basic software that provides the computer with the instructions for all basic operations. Without operating system software, a computer cannot function. Microsoft’s OS is the most common in the world and comes in many varieties, including Windows 98, Windows XP, Windows Vista, and Windows 7. Microsoft is a private company that sells its OS to computer manufacturers and consumers. Linux is an open-source OS that is available in different versions. Most Linux OS software can be downloaded for free from websites on the Internet.

global computer market and is not common in many countries. For these reasons, the Toolkit focuses on non-Apple systems.

The following is a list of advantages and disadvantages of desktop computers for schools.

- Desktop computers are the most common, and many named brands and clone systems are available in most major cities in the world. As a result, the parts that make up desktop computers, especially those where the monitor is separate from the CPU, are relatively inexpensive and easily available in most major cities.
- Because desktops are very common and based on a common set of easily available parts, they are usually less expensive than full-featured laptop computers.
- Some desktop models allow users to add new features by installing special cards or to upgrade components or to increase capacity. For example it is relatively easy to add a new hard drive to a desktop computer, but it is very difficult to do so in laptops or netbooks.
- Desktop systems are generally easier for users to maintain and repair since the CPU is relatively easy to open and many of the different components, such as power supplies, hard disk drives, and memory chips, can be replaced with easily available substitutes.
- When the screen is separate from the CPU, it can be less expensive to repair systems by replacing one defective part rather than having to replace the entire unit, as with a laptop, if repair is not an option.
- Because of their size and component structure, desktop systems take up more

space than do the three other types of systems. Once a desktop computer is set up on a desk, it dominates the desk and makes it difficult to use it for other purposes. One consequence of this is that a room with desktop computers is not convenient for non-computer uses. This is one reason why schools establish special computer labs. For example, in one high school in Macedonia, desktop computers were installed in the science room. After this was done, the teachers and school leadership realized that the students could no longer carry out science experiments on the desks because there was not enough space and liquids could easily be spilled on the computers. In the end, the school had to establish a computer lab in a new room.

- Desktop computers must be plugged into the school's electrical circuit to operate. Most desktop computers do not contain a battery, as laptops and netbooks do. As a result, the room where desktops are installed must have enough electrical receptacles and sufficient electrical capacity to support all computers operating at the same time.
- If there will be more than 10, 20 or more desktop computers in a single room, or in several rooms, on the same electric circuit, it probably will be necessary to upgrade the school's electrical system to handle the heavy load.
- Many desktop computers, especially the lowest-priced models, consume much more electricity than do comparable laptops, netbooks, or thin client systems. In Brazil, for example, each low-priced desktop and one with monitor consumed 850 watts. Therefore, 20 of these computers would consume about 17,000 kilowatts of electricity a year.



At a rate of US\$0.25 per kilowatt hour, it would cost about US\$4,250 a year just to use these computers during the school day. In contrast, 20 full-featured laptops would cost about US\$390 per year to operate in this school, a savings of \$3,860. After five years of use, the savings would be US\$19,300, enough to buy 20 or more new computers.

- Desktop computers tend to generate much more heat than do the other three systems. The more electricity a computer consumes, the more heat it produces. One consequence of this is that a room with 20 or more computers can become very hot and uncomfortable, especially in countries with hot, humid climates. This extra heat can make it very uncomfortable for users or increase the cost to operate an air conditioner to cool the room.

Also, if a computer cannot efficiently dissipate the heat it produces, the main computer chip can overheat and stop operating. Furthermore, as desktop computers become dusty inside, they will overheat more rapidly, start to function erratically, and their components will fail more often. In one school in Indonesia, for example, the rate of computer failure due to overheating caused by dust was so extreme that it was too costly to keep the computer lab operating.

To prevent computer failure and make the computer lab more comfortable for students and teachers, some schools have had to install costly air conditioning systems. While this will keep the room more comfortable, the annual cost for electricity will increase significantly, sometimes approximating the initial purchase price of the computers. This very high TCO could make low-cost desktop computers the wrong choice.

- Since desktops will remain on the desks in the computer room, it is often necessary for the school to install iron grilles over windows and doors to protect them from theft. However, this may not be sufficient; in one school in Brazil, thieves broke into the computer room through the ceiling and stole all of the computers. The annual cost of protecting the computers from theft by installing protective infrastructure and hiring night watchmen can exceed the initial purchase price. Again, the TCO for low-cost desktop computers that demand extra security features can make them very expensive.
- The all-in-one desktop computer requires less space than conventional desktop computers, making it easier to use the computer lab for other purposes. Also, all-in-one systems often consume less electricity and generate less heat than conventional desktops. In contrast, these all-in-one systems are often initially more expensive than conventional desktops to purchase and maintain.

Full-featured laptop computers are available in many different sizes and configurations, based primarily on the size of the screen and keyboard, the storage capacity of the hard disk drive, and the presence of

a CD/DVD drive. Usually, as the weight of the laptop decreases, the price increases and the durability diminishes. The following is a general list of advantages and disadvantages of using laptop computers to create a school's computer system.

- The initial purchase price of laptop computers is generally higher than that of conventional desktop computers with similar features. However, the TCO for laptop computers may be much less.
- Laptop computers are mobile; they can be stored in a cabinet or cupboard when not in use, so the room where they are kept can be used for other purposes. The mobility of laptops also makes it possible to take them from the room where they are stored to somewhere else in the school. Some schools have optimized mobility by buying special carts with wheels—which can be moved easily between rooms—to store the laptops. This makes it easier for teachers to integrate use of computers into their curriculum because students do not have to move to the “special” computer lab to use the computers to study history. With laptops, the computers can come to the history classroom.
- Generally, as mentioned earlier, laptop computers consume much less electricity than do desktop systems, which can lower their TCO.
- Laptops take up less space on student desks than do conventional desktops. This makes it much easier to create lessons where the benefits of using the computer are blended with conventional learning activities. The combination of taking up less space and having greater mobility also makes it much easier to organize learning and the use of computers into teams. Research shows that forming teams can accelerate

and improve the quality of learning. Additionally, employers emphasize that good teamwork skills are very important to success.

- One advantage of a laptop's mobility is that schools can allow teachers to borrow the laptops in the evening to enable them to prepare lessons, strengthen their skills by using the laptop, prepare lesson plans, and update student records. Experience shows that, as teachers grow used to using laptops routinely, they eventually buy personal laptops. In Indonesia, for example, none of the teachers in a rural school owned personal laptop when the first computer lab was established. Three years later, however, more than 80 percent of the teachers owned them.
- Since laptops can be stored in a steel cupboard or on a cart, it can be much less costly to add infrastructure to protect them from theft. In Puerto Rico, for example, the computer carts with the laptops are kept in a small windowless room constructed of concrete with a single steel door. It was less expensive to build these small secure rooms than to protect the entire school or individual classrooms and hire watchmen. As a result, the TCO for this school's laptop computer system is less than that it would have been for a system using conventional desktops.
- While it can be less costly to secure a cabinet where the laptops are stored when not in use, the small size and mobility of laptop computers makes them very easy to steal if they are not managed carefully. For example, in one school, several laptops were stolen during a coffee break from the room where they were being used for a teacher professional development workshop.

There are also numerous cases of laptops disappearing from schools during the school day when they are left on desks in rooms after students and teachers have left. This problem is not the fault of the laptop; it is caused by users' poor habits and ineffective school policies and procedures. This problem can be managed inexpensively by creating a culture of care and attention to the security of the computers that is everyone's responsibility.

- While the laptop's battery allows it to be used without being plugged into an electrical outlet, most laptops can operate on battery power for only two to four hours. Also, as a laptop ages, the amount of battery power diminishes. Eventually, within two or three years (about 300 to 500 full recharges), the battery will need to be replaced so full mobility can be restored. Replacing a laptop's battery can cost from US\$100 to more than US\$200.
- One serious problem with replacing a laptop's battery is disposing of the old battery properly. Most batteries used in laptops today use lithium-ion technology. While not as toxic as lithium metal, lithium-ion batteries do contain metals that can contaminate water supplies. Also, if lithium-ion batteries crack open to expose the chemical material to moisture, they can burst



into flames. Responsible schools that decide to use laptop computers will need to spend extra money to properly dispose of old computer batteries, thus increasing their TCO. Many countries do not have the capability to recycle or dispose of lithium-ion computer batteries properly, and throwing out an old laptop battery can damage the environment and be risky for children who might find old batteries and turn them into toys.

- Another problem that arises due to the laptop's limited battery life is that laptops cannot be used for an entire school day without being recharged or replacing the battery. One approach to handling this problem is to have a spare set of batteries kept in a special recharging device (as shown above) so they are kept fully charged. When needed, these spare batteries can replace batteries that need to be recharged in the recharging bay for later use. This solution increases the initial cost of the computer solution by up to US\$5,000 or more for 20 laptops. In addition to costs, there are few recharging devices as compared to the many types of batteries that are manufactured.

It is also possible to use laptops while they are connected to the school's electrical supply via the laptops' power supplies. This requires sufficient outlets in each room where laptops will be used to accommodate 10 to 20 or more computers. This probably will require the electrical supply in these rooms to be upgraded and additional outlets added, thus increasing the TCO for a laptop solution. Also, keeping laptops tethered to their external power supply and cords reduces their mobility and makes it increasingly difficult to use



An example of a recharging station for laptop batteries.

them in any room in the school and the many power cords on the floor can be a safety hazard.

- Most laptop computers on the market are designed for use in an office environment by a single user who does not open and close it many times during the day. In schools, many different people use laptops and will routinely open and close them many times a day. Most office laptop computers are simply not designed to survive the level of use that happens in most schools. One common consequence is that the hinges, especially on low-priced computers, wear out quickly and stop holding the screen open. As a result, the screens either fall shut on the users' hands or fall back against the desk possibly damaging the screen. Additionally, because of their size, the electronics for the laptop are placed just beneath the keyboard, and if a user accidentally spills a drink on the keyboard, he or she may destroy main computer board.
- Another common problem with laptops is that their screens and hard drives can be damaged easily when the laptop is dropped or bumped during use. The screens and hard disk drives in most office laptops, especially low-cost units, are not protected against sudden

movements or being dropped. In busy classrooms, the risk of this happening is high. Since laptops are more specially designed than are desktop computers, it is more expensive and difficult to find replacement parts and repair them. In many countries, parts for many laptop computers are only available in the capital city or outside the country. To address these problems, some manufacturers have created semi-rugged laptop computers that include reinforced hinges, shock-mounted screens and hard drives, and a liquid proof membrane under the keyboard to protect the system from accidental spills. Because of these additional features, these semi-rugged laptops are more costly than conventional laptops, but their TCO can be much less, especially when the laptop will be used between three and five years. Unfortunately, semi-rugged laptops are not very common in many countries, and some manufacturers advertise their systems as “semi-rugged” when they are not. If you decided to buy semi-rugged laptops for your school, you should ask that the vendor demonstrate the semi-rugged features by dropping the computer and pouring some liquid on the keyboard when the computer is turned on. If the vendor refuses to do this, the laptop probably is not truly semi-rugged.⁶

Netbook computers, which were introduced in 2007, are much smaller (see diagram on following page), lighter, and less costly than full-featured laptops. To make them smaller,

⁶ Some companies also build fully rugged computers that are fully water- and dustproof and can withstand very harsh physical treatment, including being run over by a car. These fully rugged systems are much too expensive for schools, which do not need this level of protection.

lighter, and less costly, manufacturers had to cut corners and eliminate many features common to conventional laptops. Below is a list of advantages and disadvantages of using netbook computers to create a school's computer system.

- The most common reasons people buy netbooks is their relatively low cost (US\$200 - US\$400 in late 2010) and their small size. Many schools, especially primary schools, have chosen to buy netbooks for their computer system because their initial purchase cost is less than most alternatives, and their lower capacity was not considered to be a problem for primary classrooms. The limited capacity of netbooks may, however, be a problem for use in secondary schools.
- An advantage of their small size is that they can be stored easily in a small cabinet or cupboard that can be built in one secure room in the school, thus lowering the TCO. Also, if one or two of them are stolen, the cost to replace them is much less than with other computer options.
- Due to the nature of the Intel computer chip used in netbooks, the screen cannot be larger than 25 cm (diagonal measurement). Also, the netbook's keyboard is around 20 percent smaller than a conventional laptop's keyboard. The smaller screens and keyboards can make it more difficult for older students to share them. However, the relatively low initial purchase price can enable schools to buy more of these computers so sharing among groups of students is easier.
- The netbook's small size and low-powered computer chip means that they consume less electricity, so batteries last longer than they do in conventional



This picture showing the difference in size between a full-featured laptop and a netbook computer.

laptops. However, once the battery dies, the netbook must be plugged into its external power supply to recharge and be used.

- The small size of the netbook means that it does not include a CD/DVD drive; therefore, to install and use some software, you must buy external CD/DVD drives that are plugged into one of the netbook's USB ports. This adds another cost to the system and increases the number of parts that must be managed or that can be lost, stolen, or broken. Also, using an external CD/DVD drive will reduce the time the netbook can be used before having to plug it in.
- The lowest-cost netbooks come with low-capacity hard disk drives, which can limit the ability to install educational software and makes it impossible for students to store their work on the netbook.
- Netbooks' small size makes them more fragile and less durable. They are broken much more easily, and their key components may not stand up to the intense, multi-person use that will take place in schools. Therefore netbooks may need to be replaced after two or three years rather than the four to five years for other options. However, the

low initial purchase prices of netbooks may make the TCO less than that of longer-life conventional laptops. Some companies, such as Intel and the OLPC Foundation, have designed more durable netbooks specifically for use in schools (especially primary schools). These more durable netbooks, which are more expensive than those designed for individual use, also include software (usually only available in English or other global languages) to make these computers especially useful in classrooms.⁷

- The small size of netbooks may make them less suitable for use in secondary schools, which will demand fuller-featured computers and ones that are more durable and able to withstand intense use by teenagers.

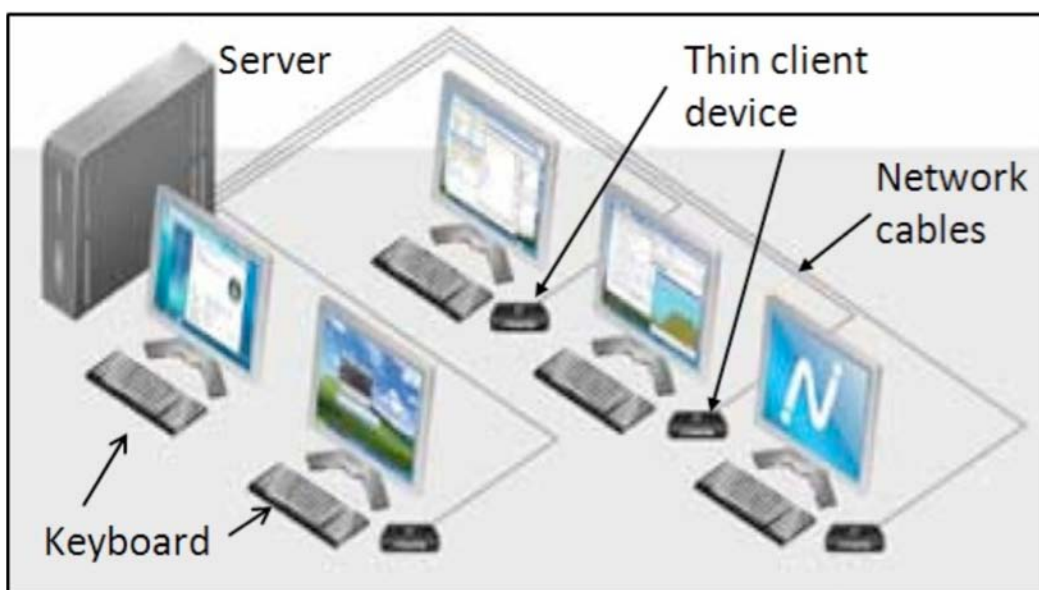
Thin client computers, which do not consist of stand-alone computers, have to be connected via network cables to a special desktop-like computer, known as a server, that provides all computing functions and stores all content and software that the “clients” need to function. A thin client system consists of a cluster of small devices, about the size of paperback books, that are connected together by cables to a server to create a network. Each device is also connected to its own keyboard, mouse, and screen.”

NComputing, a company in the United States, has developed a thin client system specifically for schools. The diagram below, from an NComputing publication, illustrates what such a system looks like.

⁷ The OLPC (one laptop per child) computer (www.olpc.org) was designed for use in primary classrooms in developing countries. Since these computers can only be purchased in very large quantities by central governments, they are not discussed in the Toolkit.

Below is a list of advantages and disadvantages of using thin clients to create a school's computer system.

- The only parts of most thin client computer systems that need to be connected to an electrical outlet are the screens and the server. Power for the thin client device is provided through the network connection to the server. As a result, the cost of electricity for a thin client system is up to 80 percent less than for a desktop system and only slightly less than laptop or netbook systems.
- Thin client systems are much less costly than conventional desktop computer systems. The cost of each thin client station (including the cost of the server) can be about the same as that of a robust netbook computer.
- Because a thin client computer system requires that each of the computer stations be connected to a server (up to 10-12 clients per server), a thin client system requires that a cabled network be installed in the room where the system is used. This often means that schools have to have a dedicated computer lab.
- A thin client system is based on having all clients connected to one or more servers. A 20-station thin client system would require two servers. To be efficient, each server must have a fast computer chip, one or more larger capacity hard drives, and more computer memory than a conventional desktop. This translates into a computer that will cost two to three times more than a conventional desktop computer. In addition, more skill is needed to set up and maintain the thin client servers than is needed to manage a cluster of conventional desktops and laptops.
- Even though the thin client device is small, the screen, keyboard, and mouse take up as much space as a conventional desktop system (especially when the CPU is stored on the floor or on a shelf below the desk), so it is just as difficult to use the desks where a thin client system is installed for other subjects as with conventional desktops.
- The companies that sell thin client system promote their systems based on studies that show that the TCO for thin client systems is up to 86% less



than conventional desktop networked systems. Even if the TCO is not 86% less, it is clear that it is much less than conventional desktop systems.

- Most schools will likely not be able to repair thin client devices. However, since there are no moving parts in these devices, they do not generate any heat, and they are not connected to the school's electrical supply, they will be less likely to need repair. As with desktop computers, servers can be serviced and repaired at schools if they have the staff with the needed skills.
- Since thin client systems targeted toward schools are relatively new, they may not be easily available in all countries and vendors may not provide support to schools outside major cities.

Networking Choices: There are many benefits to connecting the computers in your system together to form a network. The following are some of the most important benefits:

- A network makes it easier to share files and for students to access common files, documents, and educational resources that teachers have prepared for their lessons. If the school's computers are networked, teachers do not have to copy documents or exercises to each of the student's computers. They only have to copy them to the classroom folder on the central computer's hard disk. Then each student can access these common files for the lesson when needed. Similarly, each student can be assigned a specific folder on the central computer where they keep their work at the end of a session. Then teachers can easily access students' work for review, feedback, and grading.
- A network enables the system's

computers to access the printer and other peripherals such as shared, networked hard disk drives.

- A network makes it possible for all computers on the network to gain access to the Internet if the school has established an Internet connection.
- A network makes it possible for teachers to manage and monitor what students are doing during a lesson. Classroom management software enables a teacher to display an image on his or her screen on each student's computer. This eliminates the need for an expensive data projector in the classroom. Similarly, the teacher can display the screen of a student's computer on everyone's system to show how different students have completed tasks. This type of software can also be used to keep students on task, since they are not able to wander around the Internet, play a game, or work on other tasks.

Three basic types of computer networks are commonly used in schools:

1. A cabled network, often called an Ethernet network, involves connecting each computer to a central computer or network device via a special dedicated network cable installed in or on the wall, or in or along the floor of the room. Each computer plugs into the network using a short cable. To be connected to the network, each computer must be equipped with an Ethernet adapter. Fortunately, most computers sold today include a network adapter. A cabled network provides faster network communication than do the other two types of networks.
2. A wireless or WiFi network involves the use of a wireless or WiFi "radio" that sends and receives signals to

computers that are equipped with a wireless or WiFi adapter. Most laptop computers manufactured today include wireless adapters, and small adapters can be purchased and installed easily on desktops to enable them to be connected to a wireless network. The WiFi radio is then connected to a network device that links it to different devices such as a central computer or sever, a printer, a shared network hard drive, and the Internet. A WiFi network does not need to have any cables installed in the walls or floor other than the one that connects to the Internet. The speed of WiFi network communication depends on the type of WiFi system built into the computers on the network. In addition, each computer shares a fraction of the capacity of the WiFi radio, and as more computers are added to the WiFi network, the total capacity available to each computer decreases. It is similar to sharing a cake: as the number of people sharing the cake increases, the size of each person's slice gets smaller.

3. A powerline Ethernet network uses a building's system of electrical wires to connect computers together and access shared services and resources without having to install special network cables in all of the rooms in the school. The computers are connected to the building's electrical system through a powerline Ethernet adapter. This is a small device, about the size of two packs of cards (as shown above), that plugs into an electrical outlet. A network cable is plugged into the adapter, which may also have an electric outlet into which other electric devices can be plugged.



An example of a powerline Ethernet adapter

One common approach to using a powerline Ethernet network is to use it to connect a WiFi radio to the powerline Ethernet adapter so all computers in the room are connected to a wireless network, and through the powerline Ethernet adapter, they can also be connected to computers in other classrooms, the school's server, or the school's Internet access point. Since the small powerline Ethernet adapters can be moved to rooms where they are needed, it is inexpensive to create a fully networked school. This is much less costly and easier than building a cabled network that connects all of the rooms in the school or building in a school-wide wireless network.

In addition to the hardware and infrastructure needed to establish the network, software to manage access to and use the network is also needed. The simplest networks do not need any additional software; in most cases, the computer's operating system software (Microsoft XP, Windows Vista, or Windows 7) can be configured to connect each computer to basic shared devices. More advanced network functions will require that special network operating systems software be installed on the central computer or server and configured to allow each registered user to access and use network services.

Commercial network software, such as Microsoft's Small-Business Server software, can be purchased, and open-source Linux OS software can be installed for free. Setting up and managing a small school network requires some skill and knowledge however, and experience around the world shows that students can learn how to do this. In Macedonia, Brazil, Senegal, and Indonesia, for example, students who are part of schools' Student Support Technician Clubs (SSTCs) (see Unit 6 for more information on SSTCs) are responsible for maintaining their school's network

Peripheral Choices: In addition to computers, it is often necessary to include other hardware to complete your computer system. A brief discussion of some of the more common peripherals for school computer systems follows.

Printers are one of the most common computer peripherals found in school computer systems. While many printers are relatively inexpensive to purchase, the cost of ink or toner and paper can add up quickly. As with computers, it is important to evaluate printers from a TCO perspective. The many types of computer printers can be organized into three broad categories based on the needs and budgets of most schools: 1) color inkjet printers; 2) black & white LaserJet printers; and 3) multifunction inkjet and LaserJet printers.

- Color inkjet printers are usually the least expensive to buy but often have the highest per page printing costs. If you decide to purchase an inkjet printer, we recommend that you do not buy ones with vertical paper feeds. Experience shows that in schools, dust, insects, and other items can easily fall into the paper bin, which can damage the printer. We



An inkjet printer with a horizontal paper feed.

recommend that the paper bin be horizontal (as shown in the picture above).

- Black & white LaserJet printers are faster and can have a lower per page printing cost than color inkjet printers. However, they use more electricity and can be damaged more easily by power surges and low levels of electricity. They are also more expensive to buy initially and, therefore, more expensive to replace. They are also more complex and more difficult to maintain and service, and spare parts may be difficult to find in some locations.
- Multifunction inkjet and LaserJet printers combining printing, scanning, and copying functions in a single device. This simplifies the computer system and can be less expensive than buying two or three separate devices. Some multifunction printers also include fax capabilities. One of the challenges of multifunction printers is that the copying function is simply a process of scanning and printing a document. Copying on these devices is much more costly than it is using conventional photocopiers. Also, the copying function is much slower with these devices than it is with conventional photocopiers.

You should keep the following considerations in mind when evaluating different printing options:

- Make sure ink or toner cartridges are locally available for the printers you are considering.
- Calculate the TCO for the printer by estimating the number of ink or toner cartridges and the amount of paper you will need to buy each year, and then add this to the purchase price of the printers you are considering.
- Inkjet printers that offer different cartridges for each color can be less costly to use over time, since you only have to replace the cartridge that is empty. The cartridges that include all colors in a single cartridge will need to be replaced once one of the colors is used up, even if you have barely used the other colors.
- Some more expensive printers automatically print both sides of a sheet of paper, which helps to reduce the amount of paper used. All printers can print on both sides of a sheet if the user manually flips over each sheet of paper.
- Printing material from a computer is easy; users just click a button on the screen. This can make printing addictive and lead to increased expenses for printing and maintenance. Some schools address this problem by giving each student and teacher a punch card (as shown above) or coupon book specifying the number pages that can be printed for “free” during a specific period such as monthly or over a semester. Once a user has printed all of his or her free pages, the user must pay for any more he or she wants to print. The cost for additional printing is calculated on a cost recovery basis, which is the actual cost of printing one page (ink plus paper) with a 10 to 20 percent additional charge for maintaining the printer. This kind of system



A sample punch card to control printing costs.

makes people consider carefully whether they really need to print a document or not.

Uninterruptable power supplies (UPSs)

(as shown in picture below) are often purchased for each desktop computer so if the power goes off, the computer will stay on for a few moments to allow the user to turn it off properly without losing any work. Unfortunately, the batteries in these devices, especially low-priced UPSs, tend to lose their capacity to hold a charge in a year or so. Also, not all UPSs have the capacity to prevent power surges from damaging computers. The cost of these devices will increase the cost of a computer lab using desktop computers since each computer needs one device. An alternative is to purchase a good-quality **surge protector** (as shown above) that can be used with two to four computers. It is more important to



An example of a UPS.



An example of a surge protector.

protect computer equipment from power surges than to protect them only from power loss. Also, surge protectors can be used with all computer equipment. They are less costly than UPSs, so if they are damaged by a power surge they are less costly to replace than a computer or UPS. When buying a surge protector be sure that you are not just buying a simple power strip.

If electrical power at the school is unreliable, it is advisable that the power to the computer room is turned off by a main switch when the power goes off. Then each computer and all other computer equipment can be turned off. A few moments after the power returns to the school, the main switch can be turned on followed by turning on each computer and other equipment. The reason for doing this is that the greatest amount of damage due to power surges occurs when power is restored at a school. If the main switch is turned off, then the surge will not reach the computers. Another good policy is to always turn off the power at the main switch to the computer lab at the end of the day. Then, if there is a power surge during the night, no equipment will be damaged. Doing this will also ensure that the lab is not consuming power at night when no one is around. This could conserve electrical power and therefore money.

Powerline Conditioners/Stabilizers are used to keep the level of electricity (voltage) constant. This is especially important for computer networks, which can be disrupted when the voltage fluctuates. If a technician is not able to be in the computer lab to restart the network if the electricity fluctuates, then buying a good-quality Powerline Conditioner/Stabilizer might be the best solution. To protect this device from major power surges, use a surge protector between the conditioner and the wall outlet.

Data Projectors (as shown below) are used with computers to display the contents of the computer screen on the wall so everyone in the room can easily see and read the information. Projectors are often used in classrooms to allow teachers to present information to students. Projectors can be especially useful when there are not enough computers for everyone to use. A teacher with a laptop and a projector can create participatory lessons with digital content. Students can also operate the computer and share what they have created. There are two basic types of projectors, LCD (Liquid Crystal Display) and DLP (Digital Light Processing) projectors. Until recently there were few differences in terms of advantages and disadvantages between these two types of projectors. There is some evidence that the TCO for DLP projectors is less than with LCD projectors. The initial purchase price for the two types is also quite similar.



A typical LCD/DLP project.

Recently, a few companies have produced DLP projectors with LED (light emitting diode) lights that have the same level of brightness as conventional projectors. The big difference between these “bulb-less” projectors (those with LED lights) is that there is no bulb to damage or burn out. Conventional projector bulbs have a lifetime rating of 1,000–2,000 hours (more expensive projectors may have a life time rating of 4,000 hours), while LED projectors are rated at 20,000 hours or more. For this reasons, we recommend buying DLP projectors with LED light technology. It is important to look for projectors that are rated at around 2,000 lumens (the intensity of the light produced by the projector), which is the level required to project images during the day in bright classroom, especially on walls that may not be clean or white. There are several portable LED projectors rated at 100–200 lumens (as below) and cost between US\$300 and US\$500. While they may be attractive because they are portable (some even run on batteries) and relatively inexpensive, they will only work well for small groups and in a dark room. At the time this Toolkit was written, Casio Corporation was manufacturing a line of “green” LED projectors rated at 2,000 – 3,000 lumens and that generate much less heat than conventional projectors. (see below) As a result, these projectors consume much less electricity than other varieties. The TCO of the LED projectors should be much less than that of conventional systems, and they should be less prone to failure.



An LED “bulb-less” projector from Casio.

What software should we obtain for our computers, and where can we get it?

Software, which enables computers and their peripherals to function, comes with all of the instructions needed to operate, computers, communicate, and take instructions from users to accomplish specific tasks.

For schools, the many different types of software can be organized into the following four categories: 1) operating system (OS) software; 2) basic productivity applications; 3) educational software; and 4) utilities to carry out specific utility functions to manage and maintain the computer, and other applications to perform other work.

Within each of these categories of software there are three general types or varieties: a) commercial or fee-based software; b) open-source software that is free to use and allows users to modify and customize the underlying code; and c) freeware that is free to use (often only for educational users) but users are not allowed to modify the underlying software code.

The Toolkit will discuss each of these categories below to help you determine which of the software types is best for your school’s situation and needs.

Operating System (OS) Software: As mentioned earlier, two major types of OS software are available, Microsoft Windows® and Linux.⁸ Windows® is a commercial product that users must purchase. Most computers sold around the world (other than Apple computers) come with some version of Microsoft Windows® installed, and its price is included in the cost of the computer.

⁸At the time this Toolkit was written, Google Corporation had recently released the initial version of its Chrome OS. This OS is being designed to operate a computer that is universally connected to the Internet. For many schools in the world that have no or only limited access to the Internet, the Chrome OS many not be useful for some time to come.

A few manufacturers also sell computers with a version of Linux installed, and these systems are less costly than those with Windows® installed since the company didn't have to pay for the OS. It is also possible to buy computers without an OS installed so that users can install the OS that they want.

Microsoft Windows® is currently the dominant OS for personal computers. As a result, many more people know how to use, manage, and maintain Windows® than know how to use the different varieties of Linux. Also, since Windows® is more common in offices and companies around the world, it is important that students learn to use it so they have the basic set of computer skills employers demand. Unfortunately, using Windows®, especially for schools or ministries of education that are buying many computers, can make the TCO much higher than it would be if Linux were used. For example, the Ministry of Education in Macedonia decided to install Linux on the servers used with the thin client systems the government installed at all primary schools across the country. With hundreds of servers being purchased, the savings from using Linux rather than Windows® were substantial, which enabled the Ministry to buy more computers for its schools. The savings realized from using the Linux OS did not stop with just the OS. All of the other software the government wanted to install on these servers was also open source and, therefore, free from any license fees. In the end, the Government of Macedonia didn't pay any money for any of the software on these computers. It also will not have to pay for updates and future versions.

There are, however, other costs involved in using Linux. Since the teachers and computer technicians at the schools were not familiar with Linux and the other open-

source software on these new computers, the government and donor organizations that were helping to improve education in the country had to spend money to train teachers and technicians to use this open-source software. Additionally, money had to be spent to translate the OS and open-source applications to Macedonian and Albanian (the two languages spoken in Macedonia). This was both a cost and a benefit. Since Macedonian is only spoken in Macedonia (a small country with a little more than two million people), nearly all commercial software is not available in this language, and it is not possible for the country to create a local language version on its own. Since users can customize open-source software, it was possible for the government to create local language versions of its software for use in schools and households across the country.

One of the most important questions to ask when deciding which OS to use is whether people with the skills and experience with Linux and related software are available to help the school use these open-source options. For example, in South Africa and Brazil, Linux has become very popular, and a number of people are skilled in using it and a variety of other open-source applications. Because of this, schools find it much easier to choose Linux rather than Windows®. At the same time, students who learn to use Linux are not necessarily disadvantaged in the job market if they are more familiar with Linux than Windows®. Usually, students become skilled in both since the computers they have at home are usually Windows®-based systems. In other countries, this

situation will be the reverse, so choosing Linux over Windows® could end up being more expensive.

It is possible, however, to configure a computer to use both OS. The user would choose which OS to use when he or she starts the computer. This “dual-boot” configuration, as it is called, allows users to learn to use both types of OS software.

Basic Productivity Applications: The three basic types of productivity applications most commonly found installed on school computers are word processing, spreadsheet, and presentation software. Again, Microsoft is the dominant producer of productivity applications and sells them as different versions of its Office Suite, which includes Microsoft Word (word processing application), Microsoft Excel (spreadsheet application), and Microsoft PowerPoint (presentation application).

The main alternative to Microsoft's commercial application suite is a suite of open-source applications called Open Office (<http://www.openoffice.org>), which includes Writer (word processing application), Calc (spreadsheet application), Impress (presentation software), Draw (application for creating diagrams and sketches), and Base (database application). The Open Office suite is freely available to download and can be used and distributed free of charge. It is available in many different languages, and there are versions of Open Office for use on computers running Windows® and Linux. The latest version of Open Office can open and use files created with different versions of Microsoft Office applications. Also, files created with Open Office applications can be saved so they can be used by people who are using Microsoft Office.

To compete with Open Office, and to make it possible for schools to buy the Microsoft Office suite rather than “pirate” it, Microsoft has established partnerships with many

ministries of education around the world through its Partners in Learning (PIL) program, which enables public schools to receive legitimate copies of Microsoft Office at very low costs. If you are interested in using Microsoft applications, you should contact the local or regional Microsoft representative and ask whether Microsoft's PIL program is active in your country.

Google Corporation has also developed a suite of online office applications, called Google Docs, which includes word processing, spreadsheet, presentation, and drawing applications. Google Docs are designed to be used on the Internet, not on stand-alone computers.

Educational Software: Software that people use to learn something can be classified as educational software. Because this definition could include all types of software, even entertainment software and games, it is important to refine how we classify software as educational. Broadly speaking, educational software is any software that is created with the explicit objective of enabling people to learn new skills, improve existing skills, or gain and enhance critical cognitive capabilities (logical thinking, making predictions, solving problems, thinking critically, etc.). For example, there is software students can use to practice different types of mathematical tasks, improve spelling, and increase their vocabulary. There is also software to help someone learn to do a specific task such as using Windows® or other complex computer applications. Training software can also teach someone to dissect a frog, build a simple electric motor, diagnose

and repair a computer, or learn a foreign language. Other software, such as strategy games and simulations, can enable students to strengthen their strategic thinking skills,

logical thinking, and problem-solving and prediction skills while also having fun.

Educational software can also help a teacher create resources and learning aids to enhance student learning. For example, there is software that makes it easy for teachers to create crossword puzzles to help their students learn basic vocabulary and concepts. Finally, a class of educational software organizes and presents information, often reference information, to learners in interesting ways using multiple media. Examples of these types of educational software include a digital encyclopedia, dictionary, and thesaurus.

As with the software, categories mentioned earlier, some educational software is commercial, others are open source, and still others are free for non-commercial use. A connection to the Internet is needed for schools to find and download open-source and free educational applications. Schools with computers using Linux can download a comprehensive set of educational software from Edubuntu (<http://edubuntu.org/>). One part of the Edubuntu community, the KDE Education Project (<http://edu.kde.org/>) focuses on developing high-quality educational software that is available free of charge. When this Toolkit was written, KDE educational software was being repurposed to run on computers using Windows® as well (http://techbase.kde.org/Projects/KDE_on_Windows).

Before your SPT decides to buy commercial educational software, you should search the Internet carefully to see whether a similar free or open-source application is available. Then you can test this with your students before spending the money to buy software that may not be useful.

Finally, some of the best educational software is included in the suite of office applications discussed above. You and the SPT should encourage the teachers and students at your school to use these applications to create tools and resources to make learning exciting and enable students to build and practice many critical skills and abilities.

Software Utilities and Other Applications:

This is a catch-all group that includes software to help manage and maintain your computers; to protect your computer system from computer viruses, spyware, and other malicious software; to help you communicate with others around the world; to explore and use the Internet; and to enable teachers and students to do specific tasks. As with the other three categories of software discussed above, some of the software in this group is commercial, some is available for free, and some is open source. The list below briefly outlines the different types of software included in this category.

- Utilities to help you **manage and maintain your computers:** One of the most important utilities for every computer with Microsoft Windows® is some form of antivirus software. Several types of antivirus software are available free of charge on the Internet.

Even if your school's computers are not connected to the Internet, they can become infected with viruses by people who use files they created at home or at a cyber café on the school's computers or use USB flash drives/memory sticks with school computers. Many computer viruses are not destructive, but all of them can disrupt the operation of your computers and make them work more slowly. Some viruses can be very destructive by deleting files and even

disabling the computer's OS. When computers are connected to the Internet, some viruses can take control and distribute malicious software or engage in illegal activity. Other viruses can steal information stored on a computer via the Internet. It is critical, therefore, that your school installs a good antivirus application and keep it up to date by installing new antivirus definition files regularly. Doing this will require some type of access to the Internet, either by having one or more of your school's computers connected directly to the Internet, or by downloading files at a cyber café or from another computer outside the school that has Internet access, and then installing these files on the school's computers.

- Another group of useful utilities are those used to **compress (zip) and un-compress files**. One of the best free utilities for this is Zip Genius, which is available for free on the Internet in different languages. Adobe Acrobat Reader, also available for free from the Adobe website, enables users to view files that are PDFs (portable document format). Other free and commercial utilities enable you to create PDFs. One popular PDF creator is PDF995, which can be purchased for US\$9.95 or can be downloaded for free (supported by advertisements). Another useful and free utility, CrapCleaner, will help clean clutter from your computers, thus making them run more smoothly.
- Another group of utilities **enables users to communicate** with people at a distance if your computers are connected to the Internet. The most common tools for doing this are free web-based email services such as Yahoo Mail (<http://www.yahoo.com>), Gmail

(<http://www.google.com>), and MSN (<http://www.msn.com>). These services also offer free Instant Messaging (IM) services, which allow users to engage in text and voice chat with other members on the same IM network. One of the most popular tools to enable people to talk with others at a distance either via a computer-to-computer connection or a computer-to-phone connection is Skype (<http://www.skype.com>). This free tool enables users to talk for free with one or many people at the same time via the Internet when all users are connected via computers. Skype also allows people using a computer to call someone on their phone and send text messages to cell phones. These computer-to-phone services, while inexpensive, are not free.

How should the computer lab be configured for quality teaching and learning?

It is common to arrange desks in the computer rooms in a series of rows facing the front. Unfortunately, for many reasons, this is the worst possible way to arrange a computer lab. First, teachers standing in front of the room cannot see what the students are doing on their computers during the lesson. For example, it is not possible for the teacher to see whether any students are falling behind or making mistakes. Also, teachers are not able to tell whether all of the students have completed a step and are ready to move on. Also, since students are curious, it is common for them to explore the computer they are using during a lesson rather than staying on task, and the conventional arrangement in rows prevents the teacher from knowing which students are not focusing on the lesson. It is also very difficult for teachers to move among the desks, to provide personal attention, especially in a crowded lab

where two or more students are sharing a computer.

There are also practical reasons why arranging the lab in a series of rows is bad. For example, in the case of desktop or thin client systems, this arrangement makes it difficult to connect the computers to electricity and network cables. To address this issue, channels are dug into the floor for electricity and network cables and then covered with wooden, metal, or cement planks. Building these channels into the floor can add significant expense to the school's computer system and lab. Also, once the channels are in place, it is difficult or impossible to change the arrangement of the desks and computers.

For these educational and structural reasons, it is much better to arrange the desks with desktops computers or thin clients along the walls. All of the cables can then be fixed in conduits along the base of the wall without costly changes to the room's structure. More important, teachers can see what all of the students are doing on their computers and can easily move among them to provide personal attention. It is also easier for students to watch and learn from their peers and to form dynamic learning teams.

If your school chooses to buy laptop or netbook computers, you will have much greater flexibility in arranging the furniture in the room to meet active and team-based learning objectives. For example, desks can be clustered together to create learning pods or arranged along the wall. These changes in the way a classroom is organized can be made to suit a specific learning objective or lesson—the arrangement does not have to be permanent. This feature of using laptops and/or netbooks can enable your school to avoid having to create a dedicated computer lab.

Concluding Thoughts for Unit 3: After reading this unit, we hope you and your SPT are still considering establishing your computer system or lab. Evidence from around the world shows that introducing computers can have a positive effect on teaching and learning and on the relationship between schools and their communities. While it can be challenging to establish a high-quality computer system or lab, and there are many things to learn and decisions to be made along the way, the effort has its rewards—higher-quality education. The remaining units in the Toolkit will help you and your team achieve success in establishing your computer system, maintaining it so that it continues to deliver benefits, and sustaining and growing this asset at your school.

UNIT 4:

Obtaining, Optimizing and Sustaining Internet Access

4



School SPTs that are thinking about establishing their first computer system and want to explore the issue of also connecting their new system to the Internet, and school SPTs that already have a computer system but have not yet connected it to the Internet, may find this unit helpful. In many countries, the government does not provide Internet access for schools, nor do schools have special subsidized rates for Internet access. If schools in these countries want to have access to the Internet, they must figure out how to get connected, and they must use their existing school budgets, or generate additional funds, to pay the initial and ongoing costs for connectivity and use. How much your school will have to pay for Internet connectivity, if it is not paid by the government, will depend on several variables, including: a) the type of connectivity you decide to use; b) the amount of connectivity you want; c) how much connectivity you consume each month; and d) what the local Internet service provider (ISP, companies or government agencies that are in the business of providing individuals, companies, and public organizations with access to the Internet) charges you for the type of Internet and quantity of access you use. Depending on a school's situation and the variables mentioned above, Internet access costs can range from US\$30 to more than US\$800 a month. For many schools, even US\$30 a month can be difficult to pay, so it is important to determine whether the educational return on an investment in Internet access is greater than the educational return on investing scarce funds in other school activities and infrastructure. The following should help you and the SPT answer this critical question.

Why should we connect our computer system to the Internet?

As with question at the start of Unit 3, this question may appear to be simple. Members of the SPT may immediately answer, “To give our students access to all the information that can be found on the Internet so they can learn more.” However, before you and your SPT jump to this conclusion, you need to discuss this and some related questions as a team. It may also be important for you and the SPT to expand the discussion so all the teachers in the school, parents and members of the community, and students have a chance to weigh in on this question so you can learn what others think.

In some communities, parents and teachers may be nervous about allowing their children and students to have access to the Internet. They may have some sense of the importance of the information on the Internet to their children’s and students’ education, but they also may worry that

bringing the Internet to the school may expose their children and students to pornography, different ideas about religion, different perspectives on relationships between men and women, different ideas about politics, different cultural and social values with which parents and teachers may not agree, and dangerous people. These are legitimate concerns, and if they are not handled carefully and discussed openly, the school leaders may create difficult relationships with parents and other members of the community by deciding on their own to connect to the Internet.

Organizing a School-Community Meeting:

To address this important matter, you and the SPT may want to consider organizing a school-community meeting where school staff, parents, and students can discuss this topic openly. A suggested agenda for this meeting is provided on the following page.

Suggested Agenda for a School-Community Meeting to Discuss Whether the School Should Connect the Computer System to the Internet



Date: _____



Time: _____



Meeting called by: _____



Proposed Participants: _____



Proposed Agenda Items:

TOPICS
<p>Opening statement by the School Director:</p> <ul style="list-style-type: none"> • Welcome teachers, parents, and students to the meeting. • Introduce the members of the SPT and explain the role of the team. • Explain the purposes of this meeting: a) the school is considering connecting its computer system to the Internet; b) how the school plans to use Internet connectivity to improve teaching and learning; c) to hear from members of the school community about their perspectives on this question; and d) to answer questions from parents, teachers, and students about the Internet and how the school will manage access.
<p>The School Director and the SPT summarize answers to the following additional questions:</p> <ul style="list-style-type: none"> • How will the school connect the computer system to the Internet? • How much will it likely cost for Internet access, and how will the school pay for it? • How will the school use Internet access to improve school management and student learning? • How can the Internet help prepare students for further education and entry into the job market? • How can the school protect students from accessing undesirable information on the Internet? • Distribute a document that summarizes the answers to these questions.
<p>Open the meeting to comments and questions from the community [A summary of this discussion would be written on large sheets of paper at the front of the meeting to keep a record of the discussion. A list of next steps would be recorded.]</p>
<p>The School Director summarizes the discussion and presents the next steps.</p>
<p>The School Director asks participants to vote on the question by a show of hands. [This could be a formal vote to decide what the school should do, or an informal vote to determine how people feel.]</p>
<p>The School Director closes the meeting by thanking everyone for coming. [If appropriate, the school may invite all participants for refreshments and socializing.]</p>



Additional Instructions:

Before this meeting is organized, the SPT needs to prepare answers to the questions listed in the agenda for this meeting. The following sections of this unit will help you prepare your answers to these questions.

What are the different ways to connect a computer system to the Internet?

There are a variety of ways that can be used to enable schools and others to establish a connection to the Internet. The table below summarizes the most common ways that schools use to connect their computer systems to the Internet and some

advantages and disadvantages of each approach. Not all of these options will likely be available where your school is located. In the next section of this unit you and the SPT will research which connectivity options are available in your area, the local requirements for each option, and what each available option will cost.

TECHNOLOGY OPTIONS	FEATURES AND REQUIREMENTS	BANDWIDTH RANGE	ADVANTAGES / DISADVANTAGES
Dial-up	Dial-up Internet access uses a normal phone line to connect a computer to an ISP. It requires a modem (which is often a standard part of your computer); a phone line; and an account with a local ISP. This is one of the simplest and oldest forms of Internet access. This is an on-demand form of access. You control when you are connected to the Internet, that is, a person or the computer must "dial" the ISP using the modem (similar to making a phone call) to connect to the Internet. When the person is done using the Internet the connection is closed (hung up).	The access speed is a maximum of 56Kbps (the slowest form of Internet access) and uses an analog signal (not digital) to send data and information to and from the ISP.	<p>Pros:</p> <ul style="list-style-type: none"> Relatively inexpensive (some governments subsidized dial-up access for schools). Wide availability where phone lines are present and often uses local or toll free numbers to dial. May use existing infrastructure (a phone line). Access can be controlled by staff or user automated settings. <p>Cons:</p> <ul style="list-style-type: none"> Occupies the school's phone line so others cannot use it while connected to the Internet. Charges for time on the phone line can increase the total access cost. Connection is not always "on." Slow, so sharing access among many (5 or more) computers is difficult. One connection per phone line unless additional equipment or software is purchased (depending on the operating system).
ISDN (Integrated Services Digital Network)	Like dial-up, this option uses an existing phone line for access, and users need to initiate the connection to the ISP. This is an aging technology that is being replaced by DSL/ADSL (see below) in many countries. Internet access is charged according to the amount of time you are connected, usually by the minute.	The access speed ranges from 64Kbps to 128Kbps. It uses digital signals to communicate with the ISP.	<p>Pros:</p> <ul style="list-style-type: none"> Does not tie up a phone line. Voice calls can be made while connected to the Internet. Wide availability where the technology is still being offered. Usually faster than a 56Kbps dial-up. <p>Cons:</p> <ul style="list-style-type: none"> ISDN is notoriously difficult to set up and troubleshoot. This is an outdated technology. Per-minute charges are usually applied and can add up. Access speeds often are not as fast as what the ISP advertises. Connections are not always "on." Not practical for more than 8–10 computers. Limited expandability.
DSL/ADSL (Digital Subscriber Line / Asymmetrical Digital Subscriber Line)	Unlike dial-up, DSL/ADSL provides "always-on" access using a DSL or ADSL modem and a dedicated line that the ISP installs. The ISP usually offers different speeds for sending information to and receiving information from the Internet (uploading and downloading). Since this option can offer sufficient speed to connect all of the computers in the school to the Internet, additional network equipment probably will be needed.	Access speeds range from 128Kbps to 1.54Mbps. The upload and download speeds are often different, with uploading being slower.	<p>Pros:</p> <ul style="list-style-type: none"> Affordable relative to other broadband options. Shares a telephone line, but often a new line must be installed. Wide variety of speeds and prices. There is often a choice of service providers from which to choose. <p>Cons:</p> <ul style="list-style-type: none"> Available only in limited areas. Actual speeds can vary widely and differ from what is advertised. You must be within 2 kilometers or so of the switching site; the farther away you are, the lower the speed the ISP will be able to offer you.

TECHNOLOGY OPTIONS	FEATURES AND REQUIREMENTS	BANDWIDTH RANGE	ADVANTAGES / DISADVANTAGES
Cable	Cable Internet access connects you to the Internet through a coaxial cable, often using the same line that carries your cable TV service. A special modem is needed to connect the actual cable to your computer system. Cable connections offer very high connection speeds, 1 – 2 Mbps, at low costs, however the connection is shared with other cable users and this can cause speeds to change as others use the service.	Access speeds range from 500 Kbps to 2 Mbps and higher. As with other broadband services, upload and download speeds may differ.	<p>Pros:</p> <ul style="list-style-type: none"> • Wide availability where TV cable services are offered. • Relatively inexpensive compared to other broadband connectivity options. <p>Cons:</p> <ul style="list-style-type: none"> • Sharing with neighbors poses some unique security risks and congestion problems. • Router required to share the connection with more than one computer.
WiFi/WiMax	These two forms of wireless Internet access are usually available in larger towns and cities, and ISPs use them for either point-to-point delivery of service (WiFi) or to offer comprehensive access across the entire city. WiFi access is also used to provide “last-mile” connectivity in rural areas to connect wired access (ADSL for example) to a location that is 15-30 kilometers away. Such access demands a clear line of sight between the source and the destination. WiFi point-to-point access requires a directional antenna and a wireless receiver. WiMax only requires a WiMax receiver; however, WiMax is not commonly available.	WiFi access speeds range from 11Mbps to 54 Mbps and can vary due to distance from the transmitter, materials the make up buildings, and quality of the antenna. WiMax speeds range from 1.5 to 2.0Mbps and higher.	<p>Pros:</p> <ul style="list-style-type: none"> • No cables needed, but for WiFi, line-of-site between the source and the school is required for the signal to be received. WiMax does not require line-of-site. • Enables “last-mile” connectivity for rural schools that are 20 Km or so from a source of connectivity. • Can be delivered via a series of wireless connection points to a rural school. • Relatively simple to install and configure. <p>Cons:</p> <ul style="list-style-type: none"> • WiFi requires an antenna and line-of-site link to the source. This can be difficult in congested cities. • Requires a special modem for both WiMax and WiFi. • WiMax connectivity is relatively uncommon and usually restricted to large cities.
Cellular-based: GPRS, EDGE, CDMA 2000, EVDO, G3, etc.	Cellular-based access requires a cell phone network that offers 3G (third generation) or CDMA 2000 (Code division multiples access) data and voice services in the community where the school is located. A 3G, CDMA2000 or cellular modem (which is usually a small inexpensive device) is required to connect a computer or computer network to the Internet via a cell phone provider. Access time is often paid in the same way as voice calling. Some data services charge according to the length of time you are connected to the network and the amount of data transmitted and/or received.	Access speeds range from 56Kbps to over 500Kbps. This speed depends on the type of service available, the strength of the cell signal, the distance from the nearest cell tower, and the nature of the building where the cell modem is used.	<p>Pros:</p> <ul style="list-style-type: none"> • Widely available where cellular phone service exists. • Simple and easy to install and use. • Fairly reliable. • Best used for occasional Internet access or for high-priority Internet uses such as urgent communication. • Connectivity hardware is inexpensive. <p>Cons:</p> <ul style="list-style-type: none"> • Can be expensive compared to DSL/ADSL or cable service. • Occasional slow speeds can limit its use for sharing access among more than 1-2 computers. • Some of the more specialized cellular services are not commonly available. • Occasionally, you have to sign a one- or two-year contract for voice services to get data services.
Satellite - VSAT	This options requires installation of a satellite dish (US\$800–\$3,000 depending on the type of satellite service available), which is then connected to your system. Satellite access enables rural users or those who need broadband access, but where DSL/ADSL is not available, to gain fast access to the Internet. Satellite connections can be affected by rain and dust storms.	Speeds depend on the type of service (shared or dedicated). Speeds range from 64Kbps to 5Mbps uploading and 128Kbps to 11Mbps downloading	<p>Pros:</p> <ul style="list-style-type: none"> • You can access the Internet anywhere you have a clear exposure to the sky where the satellites is located (not blocked by trees or buildings). • Available almost everywhere but must be within the “shadow” of transmitting satellites. <p>Cons:</p> <ul style="list-style-type: none"> • Upload speed is not nearly as fast as download speed. • Very little competition and therefore prices can be very high. • Heavy users of bandwidth are often affected by “fair access policy” limiting use.

Which Internet connectivity options are the best for our school?

To answer this question, you and the SPT members will need to learn which options for Internet access are available in your location, the technical specifications for each option, the levels of connectivity speeds available, and what providers will charge for the different types of service and levels of access speed.


One approach to carrying out this research is to have members of the SPT visit companies, cyber cafés, if they exist, other schools and government offices, and households to learn whether they have Internet access, and if they do: a) what types of service they use; b) which ISP they have contracted with; c) whether they are happy with the quality and reliability of the service provided; and d) the access speeds they use. If you learn that no organizations or individuals in your location have Internet access, you will need to visit the nearest large town to identify ISPs and/or telecommunication companies to find out whether they are able to provide Internet access to your school and are interested in doing so.

Below and in the Toolkit’s Annex and CD is a **Connectivity Research Data Sheet** you and members of the SPT can use to record the information you collect for each type of Internet access available in your location. Once you have completed the research, one or two members of the SPT can evaluate the results and recommend the best Internet access option for your school.

Once the best option has been decided on, you and the SPT will need to determine whether the school can afford to pay for the type and level of Internet access you feel is best. You and the SPT also may need to consider a mix of income-generating activities (see Unit 7) to raise the money needed to establish Internet access and pay monthly access fees. If the school is planning on sharing Internet access among all of the school’s computers, it is important to develop policies about how this access should be used and shared. For example, if one person starts to download a large file, such as a movie or music file, everyone else’s access will be negatively affected.

CONNECTIVITY RESEARCH DATA SHEET				
TECHNOLOGY OPTIONS	AVAILABLE? YES/NO	SPECIFICATIONS / SPEEDS	ESTIMATED ANNUAL COST	COMMENTS
Dial-up				
ISDN (Integrated Services Digital Network)				
DSL/ADSL (Digital Subscriber Line / Asymmetrical Digital Subscriber Line)				
Cable				
WiFi/WiMax				
Cellular-based: GPRS, EDGE, CDMA 2000, EVDO, G3, etc.				
Satellite - VSAT				

Fixed line vs. 3G wireless connectivity

 Securing reliable and affordable Internet connectivity, with sufficient bandwidth for the large number of simultaneous users at schools, is one of the most significant challenges facing schools, especially rural schools, around the world. For example, many schools are not connected to the national fixed line telecommunication grid and therefore wireless or satellite connectivity are their only options. Satellite connectivity has very high installation costs and with monthly connectivity expenses that can equal the salary of three or more teachers this option is out of reach for most public schools.

Fortunately, access to the Internet for many schools has recently become affordable as national cell phone networks have spread rapidly out from urban areas and the providers have expanded their services to include 3G wireless connectivity. Depending on your school's location, there maybe one or more cell provides that can provide Internet connectivity. To learn about your options, you will need to talk with your local cell phone providers to:

- find out if they offer Internet connectivity and if they do, what pricing plans are available;
- find out if they offer discounts to schools; and
- find out about the technical support they provide.

In many areas, the signal infrastructure and market demand for 3G wireless connectivity is not sufficiently developed to provide the level of reliable connectivity for full Internet access at your school or it may be expensive and priced per unit of content downloaded. However, it may be sufficient to enable access to email for staff and limited Internet use. Before signing up for wireless connectivity, ask for a month-long trial program so that you can validate the providers claims of signal strength and reliability. You will also want to compare the costs and features of the wireless solution to other options that may be available. Since technology and access to different connectivity options change rapidly, you will also want to reevaluate your Internet connectivity options at least once or twice a year.

How can we ensure appropriate and safe use of the Internet in our school?

One of the main concerns of parents and teachers about providing Internet access in schools is ensuring that students are not exposed to undesirable content. While different approaches can be used to address this concern, none of them is 100 percent successful. There are simply too many ways people—especially curious smart students—can use the Internet to gain access to information that teachers and parents may consider as inappropriate. All the school can do is to encourage students and teachers

not to use the school's computers in inappropriate ways and to take physical steps to make it difficult to access inappropriate content. To achieve this, you and the SPT can use any of four approaches that have proven successful in limiting teachers' and students' access to inappropriate content:

1. Establish policies, in a collaborative way with teachers and students, specifying how the school's computer system should and should not be used, a code of conduct for Internet use, and define strict consequences for people not following these policies.

2. Organize the physical layout of the computer lab so all screens are visible from anywhere in a room so users will be inhibited from accessing inappropriate content.
3. Use software to prevent users from accessing websites known for inappropriate content.
4. Organize discussions among teachers and students about why some Internet content is inappropriate and about the role of gender in how we use computers and the Internet.

Rules and policies alone do not change people's behavior. However, good rules and policies mandating how students and teachers should and should not use computers are a necessary condition to inhibit inappropriate behavior. These

policies and rules should have two important features. First, students and teachers should develop them collaboratively; they should not be imposed by the school director. If the staff and students do not play an authentic role in creating these policies, they probably will not follow them. Second, the consequences for not following these rules must be applied equally to every member of the school and community. No one can be above the rules. If the principal is found breaking the rules, then he or she must suffer the same punishment as a student would.

Another aspect of this approach is to have students and teachers create a school-wide code of conduct and have each person sign a personal contract, a commitment to peers, teachers, and parents that each member of the community will use the computer system appropriately.



As discussed in Unit 3, arranging the computers in the lab along the walls contributes to more effective educational use. This same arrangement can also mitigate inappropriate use of computers since what people are doing will be visible to all other users. This is a simple way to influence the behavior of students and staff.

The latest version (version 8.0) of Microsoft's Internet Explorer® (IE), the software for exploring and using the Internet that is part of the Windows® OS, can be set to restrict access to websites through a feature under the "Tools" menu option, called "Parental controls." The computer system administrator can set IE to prevent users from accessing specific websites and types of web content. Setting up IE's web-filtering feature should be done very carefully so you do not accidentally restrict valuable education information. For example, if you decide to filter any content with the word "sex," you will prevent students from researching sexually transmitted diseases or learning about HIV/AIDS.

The other two major browsers for the Windows® OS, Firefox and Google Chrome, do not yet (as of 2010) have parental controls. However, you can download a free add-on to Firefox to filter web content. When this Toolkit was written, Google Chrome did not have parental control capacity. This fact shows how difficult it is to limit

web access. Once students learn that IE and Firefox won't let them visit certain websites, some will simply download and use Chrome. To help address this problem, the school can download additional software to inhibit access to inappropriate websites. One product with this capability is "K9 Web Protection" (<http://www1.k9webprotection.com/>). Again, using software to control access to content cannot provide 100 percent protection; it can simply make it more difficult to access inappropriate content. Web-filtering software alone will not protect the school, but these three other approaches when used together can increase the odds of success.

One of the most important things you can do to influence inappropriate behavior on the Internet is to discuss the issue openly with teachers and students. It is important that this not be done from a dictatorial perspective with heavy-handed punishments and threats. By talking about the issue openly, frankly, and professionally, you can help students and teachers understand why it is important to manage this community resource responsibly and respectfully. Such discussions should take place occasionally during the year, and, over time, you will create a new culture around the use of the Internet, a culture that will incorporate internal rules of conduct to reinforce the written code of conduct for using the school's computers.



UNIT 5:

Evaluating Your Current Computer System

5



Before you can decide the future direction of your school's computer system, it is vital to have a complete understanding of its current state. This unit will help you collect information about your school's computer system and effective use, which you will use to help guide your planning process.

What computer resources are at our school, and what is the condition of these resources?

Before you can prepare a plan to sustain and maintain your school's computer system, it is essential to have a detailed list of what computer equipment, software, and related computer resources the school owns, the age of this equipment, and its operational condition. To collect this information, a sub-team from the SPT should carry out a detailed assessment of the school's computer system. Some schools may have an existing inventory of their school's computer equipment and software. Even if your school has such an inventory, we strongly recommend that you carry out an updated assessment using the Toolkit's **Computer System Status Assessment form** found at the end of the Toolkit and on the accompanying CD.

What information should we collect about our school's computer resources?

You will want to collect a mix of quantitative and qualitative information about all computer resources at the school. The Toolkit's **Computer System Status Assessment form** will help you carry out this assessment.

What should we do with the data from our school's computer system assessment?

After the assessment team has used the Toolkit's **Computer System Status Assessment form** to collect data on your school's computer system, it will need to create a summary report for the SPT and the larger school community. It is important that the data sheets and the report present an accurate picture of the status of your school's current computer system. Schools often have a heterogeneous computer system with a diverse mix of equipment and software. It is also common for some of their computer equipment not to be working or working only partly. Some schools may even have more computers that are not working than those that are operational. Some school staff may feel embarrassed about the status of their computer system and may want to modify the report and only discuss functioning equipment. It is critically important, however, that the assessment team present an accurate status report of the entire computer system since it is impossible to develop an effective CSS plan if it is based on inaccurate information and an incomplete report.

Some in the school community may become upset when they learn the truth about the status of the computer system, and fear of

this may discourage the principal, teachers, or others from producing an accurate report or not distributing the report to the whole school and the surrounding community. Experience shows, however, that most members of a school's community are more willing to support improvements in the computer system if they know the truth about the status of the current system and what the school is doing to improve it. An honest approach to communicating the system status helps build the credibility of the SPT and ensures meaningful improvements.

The following sample of an assessment report will assist the assessment team in preparing your school's summary report. You can use this sample report and the **Computer System Status Assessment Report** template, found at the end of the Toolkit and on the CD, to prepare your report. Because each school's computer system is unique, each assessment team must use its best judgment in modifying the Toolkit's School's Computer System Assessment Report template to summarize the status of its school's computer system effectively.

How do we, the school administrators, teachers, students, and others, use our school's computer resources?

In addition to assessing the status of the school's computer system, it is important to assess how different members of the school community use the computers. Some of the main goals of your school's CSS plan is to enable the school to improve how computers are used, ensure that all teachers and students make optimum use of these resources, and make it possible for other members of the school community to benefit from the computer system. To achieve those goals, it is important to have a

clear understanding of how members of the school's community, especially teachers and students, use the school's computer system.

You can learn how members of your school's community use the school's computers by surveying how people use the computers. A sample **Computer Usage Survey** for students, staff, and community members is included in the Annex and on the CD. Members of the SPT should review and modify this sample survey so it is appropriate for your school and answers all of your questions about how members of your school's community uses computers.

It can be very time consuming to have every member of the school's community complete the survey. It is much better to select a sample of people from across the community, made up of administrative staff, teachers, students, parents and other from outside of the school. The following suggested list of who should take the survey includes a sample method for choosing individuals from each of these groups to create the survey sample.

- Since the school administrative staff is likely small, **every member of the staff** should complete the survey.
- Similarly, **every teacher** should complete the survey.
- Not all students need to complete the survey; **10 percent of the students in each grade** should be sufficient. To select these students, have each student in each grade print his or her name on a strip of paper and place them in a box. Each box should include only the names of students in the same grade. Then, after the strips of paper are mixed up, select 10 percent of the strips from each box. These students will complete the survey.

Sample:

Computer System Status Assessment Report

March 15, 2010

REPORT SUMMARY

Our school has a total of 23 computers and two printers. Two of the computers are located in the school's offices one in the Director's office and one in the Accountant's office. Both of these computers are working. One of the printers is in the Director's office and it is working. One of the computers is in the teachers' room. Unfortunately, the computer in the teachers' room is not presently working and has not been working for at least six months. The remaining 20 computers are in the school's computer lab. Of these 20 computers, only 12 are working properly. The 8 computers that are not working have not been working for at least six months. We believe that these 8 computers have a mix of problems from burned out power supplies and hard disk drives that are not working. All of the 12 computers that are working have problems with computer viruses. The second printer, which is in the computer lab, is not working. When turned on, the lights on the printer would glow but it was not responsive to the computer that was connected to the printer. We could not determine why the printer wasn't working. The school is connected to the electric grid. Periodic power outages and brownouts appear to cause some of the problems that the computers suffer from.

The computer lab was dirty and disorganized.

All of the computers that were working were running Microsoft Windows 98. Each of the computers also had a copy of Microsoft Office that includes MS Word, MS Excel and MS PowerPoint. The copies of Microsoft Office were not purchased.

None of the school computers were connected to the Internet. Internet access is available in our town and the school could pay for an account if there was a desire to get connected to the Internet.

The school's computer teacher, who is a part-time employee, is responsible for the school's computer lab. He provides some limited maintenance and technical support in an effort to keep the computers running.

PURPOSE OF COMPUTER SYSTEM ASSESSMENT REPORT

This report is designed to provide the SPT with an accurate assessment of the numbers of computers and other equipment in the school and the status of this equipment. The report provides a base-line understanding of the status of the school's computer system for the SPT to develop a sustainability plan.

COMPUTER SYSTEM ASSESSMENT PROCEDURE

The Assessment Committee of the SPT was responsible for planning and carrying out the assessment of our school's computer system. We used the attached Computer System Assessment form to record data. The school's computer teacher, who was a member of this committee, provided the technical skills to complete the assessment forms for the different computers in the school. We visited the rooms in which computers were located. Each computer and piece of equipment was turned on and used by members of the committee.

HELPFUL HINT



Download a fully customizable version of this sample on the accompanying CD-ROM.

ASSESSMENT FINDING

ITEM/EQUIPMENT BRAND NAME & LOCATION	TYPE OF HARDWARE, SOFTWARE, OR OTHER RESOURCES	AGE (months)	QTY	OPERATIONAL CONDITION (good, fair, poor, not working)	OTHER RELEVANT INFORMATION (is it being used? Description of any problems, type of power source)
Orion desk top computer, LCD monitor, keyboard and mouse - Director's office	Computer, MS 98, MS Office	4 m	1	Good	This computer seemed to have problems with viruses.
HP Inkjet Printer - Director's office	Printer	4 m	1	Good	
Unnamed desktop computer, TV like monitor, keyboard and mouse - Accountant's office	Computer MS 98, MS Office	12 m	1	Fair	The computer runs slowly. This may be caused by viruses.
Unnamed desktop computer, TV like monitor, keyboard and mouse – Teachers' room	Not known	24 m	1	Not working	Has not been working for at least 6 months. The IT teacher thinks that the power supply was burned out.
Compaq desktop computers, TV like monitor, keyboard and mouse (with covers) – Computer lab	Computers, MS 98, MS Office	Over 24 m	20	12 in fair condition 8 not working (4 would not turn on, 4 would turn on but would not operate) The 12 computers that work appeared to have viruses. The IT teacher thinks that the power supply and hard drive failures are the cause of failure. The non-working computers have been this way for at least a year.	
HP InkJet Printer – Computer lab	Printer	12 m	1	Not working	The lights would come on but it would not print.
Internet					The school does not have access to the Internet, but access is available in our community.

ANY OTHER INFORMATION ABOUT THE SCHOOL'S COMPUTER SYSTEM:

- The SPT can use the remaining strips of paper in the box to select parents who will complete the survey. **For parents, only five** names should be selected from each box. To ensure that an equal number of mothers and fathers complete the survey, the SPT members responsible for carrying out this assessment can assign mothers to every other name selected.
- The SPT members responsible for carrying out the survey should ask the people taking the survey not to discuss it with others until everyone has completed the survey.

After the surveys have been completed, the SPT members responsible for this task should compile the responses using the **Survey Data Entry Sheet**, similar to the one provided on the CD that is part of the Toolkit. If you modified the sample survey, you will also need to modify the spreadsheet to incorporate responses to any new questions included in the survey.

To speed up the process of compiling the responses, and to enhance learning at the school, the SPT may want to work with a math teacher and teams of students in the highest grade to convert text responses to numerical data in the spreadsheet. To do this, each team of students should be given a copy of the spreadsheet and an equal number of survey forms. The teams of students also will need instruction on how to use the survey form and the **Computer**



Jing “How to!” Videos

The CD at the end of the Toolkit includes a set of Jing¹ “How to!” videos designed to help you and the members of the SPT learn to use this **Survey Data Entry Sheet** and other tools. This and other Jing “How to!” videos provide step-by-step instructions that show how the tool is used. You will see the actual template being used as a narrator walks you through the process of using the tool. In the case of the **Survey Data Entry Sheet**, you do not need to know how to use Excel. The video will provide you with sufficient instructions to use the tool.

¹ Jing is a tool that enables users to create screenshots and screencasts on their computer. It can be downloaded at <http://www.techsmith.com/jing/>.

Usage Survey Scoring Sheet (also available on the Toolkit’s CD) to convert survey responses that are in words into numbers and to record these numbers in the correct place in the spreadsheet. The Toolkit’s spreadsheet includes all of the formulas needed to calculate results from the survey, which will help the SPT interpret the results.

After each student team has completed converting the survey information to numeric data, the spreadsheets should be copied into one workbook so the totals from each question on each worksheet can be added together on a summary sheet. A report on the survey findings can then be prepared and submitted to the full SPT and distributed to the larger school community.



UNIT 6:

Creating Your Sustainability Plan

6

[A Testament to the Toolkit's Effectiveness]

“I really appreciate the program on achieving sustainability. This opened my eyes about how to handle the computer lab and seeing many potentialities of the computer lab for school and to promote community outreach. Previously, my school had problems even for covering basic expenses, now we have resolved this through an effective management cycle—planning, implementing, and controlling. By having the SSTC [Student Support Technicians Club] in my school, maintenance is no longer an issue. We are able to maintain the computer lab almost for free which is done through mutual collaboration among the IT teachers and students. The students are also excited because they have more time to learn IT.

I am involved in this program basically by controlling the implementation of the sustainability plan. After agreeing on our sustainability plan in our faculty meeting and the PTA regular meeting, I asked the small team to pay attention seriously in implementing the plan. All problems related to finance and other resources are solved through agreed meetings and good communication. Thank you for assisting my school in establishing our sustainability plan.”



—Sutamto, *Principal of SMAN 1 Rebang Tangkas Public School
in Southern Sumatra, Indonesia*



Deciding on the future direction of your computer system is not an easy task, and will require deliberate thought and the input from members of the school's community. This unit will help you move toward sustainability by effectively involving community members in strengthening your school and creatively reducing costs.

What do we want our computer system to become over the next five years?

Knowing the status of your school's computer system and how teachers, students, and others use the current system is only part of what you need to prepare an effective CSS plan. You also need to have some idea of the characteristics of the future computer system your teachers, students, and community members want to create. If people just want the current computer system to be maintained, then the school's plan will be much different from that of a school where the community wants the computer system to grow so students' and teachers' access to computers and the Internet is increased.

How can we learn what community members want our computer system to become in the future?

One way to help you understand what community members want the school's computer system to become in the future is to carry out a series of focus group meetings where a similar set of questions is discussed with different groups of people at the school. We recommend that you hold focus group discussion (FGD) meetings with the following groups:

- the SPT;

- a group of school staff comprising teachers and administrative staff (not members of the SPT);
- two to three groups of students from different grades;
- a group of parents who have students in different grades in the school; and
- a group of community members who are not parents.

An effective focus group should meet the following characteristics:

- Each focus group should have an equal number of male and female participants.
- Include no more than 12 people and no fewer than six people in any focus group.
- Hold the focus group meeting in a comfortable and quiet room.
- In advance, distribute to the school community information about the purpose of the focus group meetings, the topics that will be discussed, and how the participants are selected.
- The focus group should last from one to two hours.
- Develop four to eight primary questions and/or topics for each focus group discussion. These questions should remain consistent for all groups.

- If possible, the school should arrange for someone who is not associated with the school to facilitate the focus group meeting and discussion.
- Another person, who will not participate in the discussion, should take notes during the meeting so information from each focus group can be collected, compared, and compiled into a report.
- The focus group facilitator should engage the members of the focus group in an open and dynamic discussion about the focus group questions. The facilitator should ask follow-up questions during the discussion to encourage participants to provide detailed responses rather than just “yes” or “no” answers.
- The facilitator should also ensure that all members of the group participate in the discussion by asking each one to respond to different aspects of the discussion. For cultural reasons, you may need to divide men and women into different groups for the question session so women will feel freer to talk about their interests. (The **Focus Group Discussion Guide** with tips for organizing and running an effective focus group discussion is found in the Annex.)

What questions and/or topics should be part of a Focus Group Discussion?

The focus group topics and questions should focus on what members of the school’s community want their computer system to become over the next five years. The discussion should not focus on the current system except to establish what the status of the system is today. The participants should get the Computer System Status Report to read before the Focus Group Discussion so they all have a similar understanding of the current system. Below are some possible

questions for the SPT to consider asking. The SPT can use these sample questions to create a set of questions that specifically meets your school’s needs. You should also modify these questions so they reflect the situation at your school.

- What aspects of education at the school should the future computer system support, enhance, enable, and improve? Why?
- How much time should each student spend using computers during the school day in a typical week? Why?
- Should students use computers only in a lab, or should they be able to use them in other classrooms as well?
- Should the school’s computers be available to others in the school’s community during non-school times such as evenings and weekends?
- Should the school organize fee-based activities that would enable it to generate income from the use of its computer system? If, so, what kinds of rules should be put in place to manage such a system?
- What do you think will be the most important challenges the school will face with respect to its computer system over the next five years? What might be some possible solutions to these problems?
- If you were part of a school committee that makes decisions about how to spend school funds to improve the school’s computer system each year, what would your spending priorities be? [To help participants discuss this question, the facilitator may want to have them consider aspects of a computer system, such as adding computers, printers, Internet connectivity, maintenance, security, training

of teachers, community members' use of the system, software, integrating computers into routine subjects, controlling use to keep students from accessing inappropriate content, etc.]

- What percentage of the budget do you think should be dedicated to maintaining and expanding the school's computer system? Why?
- If you believe that the amount of money the school spends on the computer system should be increased, what can the school do over the next five years to raise these funds? [If participants have a difficult time with this question, the facilitator may want to mention different possible sources of funds. Such sources might include increasing student school fees, organizing special fundraising events, using the computer system to generate revenue, charging fees for special after-school activities for students, seeking grants from different sources, establishing partnerships with private companies near the school to sponsor improvements in the computer system, etc.]

During a FGD, it is common for participants to get very involved, which may lead the group's discussion going off topic. The facilitator needs to use his or her judgment about whether to allow the group to take the discussion away from the topic.

How should the SPT use the results from the Focus Group Discussions?

The SPT should select a sub-team to summarize focus group members' priorities for the school's computer system over the next five year and translate them into a "wish list." Based on how often different groups mentioned items/perspectives, the focus group team should arrange the summary list

in order of priority, from the most important (the most commonly mentioned) to the least. The sub-team can then present this list of priorities to the full SPT for discussion.

In addition to ordering the most commonly mentioned items/perspectives (from most common to least), the focus group team should try to organize the list according to which items on the list they think can be acted on and achieved. Some of the items in the list probably can be addressed fairly quickly and at little or no cost (for example, encouraging students to turn off the computers when they are not being used). Other elements will likely take longer to be implemented and involve more money (for example, establishing Internet connectivity with a suitable amount of bandwidth to meet your school's needs). Some elements probably will require ongoing and continuous attention by the school as the quality of the computer system improves.

The FGD process will expose many important points that the SPT will want to use to create critical goals and objectives for the CSS plan. It is critical that elements of the plan come from members of the community so these individuals will want to support the plan and help the SPT raise the funds needed to implement it.

The focus group process probably will expose misunderstandings or misinformation about the school's computer system, the budget, policies, or the purpose of the CSS planning process. If this happens, the school director and the SPT must provide explanations and additional information to improve understanding and ensure that members of the school community have precise information and a consistent understanding.

How much money is the school currently spending to buy computer equipment, provide Internet connectivity, and operate and maintain our computers?

Knowing how much money your school is spending on the computer system and as the sources of these funds, is essential to developing a viable plan to sustain the current system, to improve and grow it. To address this need, the SPT should ask the school accountant or finance officer to prepare a financial report covering the last three years (or however long the school has had computers) that shows how much money was spent on different aspects of the computer system.

The first part of the computer system financial report, the **Expense (or Computer System Costs) Report**, should answer the following questions:

- How much money is spent annually to purchase different types of equipment, including computers, printers, scanners, and other hardware?
- How much money is spent annually to buy software?
- How much money is spent annually for salaries of employees who spend at least 50 percent of their time managing and running the school's computer system?
- How much money is spent annually to pay consultants to provide different services to support the school's computer system?
- How much money is spent annually to repair computer equipment?
- How much money is spent annually for Internet connectivity?
- How much money is spent annually for other computer system consumables, including ink or toner for printing, disks and CDs, and paper?
- How much money is spent annually for electricity (or diesel for the generator) to operate the computer lab?
- How much money is spent annually on training staff to use the computers?

Not all schools will spend money in each of these categories. However, the report should include all expense categories during the last year. The finance officer may only be able to provide estimates for some of the answers. Where only estimates can be provided, the SPT may want to ask the finance officer to modify the school's accounting system to allow more accurate information in the computer system's annual financial report in the future.

How much money do we collect annually to support our school's computer system?

The second part of the computer system financial report, the **Income and Revenue Report**, should present information on the different sources of money used to cover the cost of the school's computer system. Below is a list of possible categories for this part of the financial report.

- Monthly computer use fees, if any, that all students pay.
- Monthly computer system use fees that only some students pay for extracurricular activities, if any, that involve the use of the school's computer system.
- The portion of the school's regular student fees all students pay each month that is allocated to support the school's computer system.
- Funds from special school fundraising activities to support the computer system that are not related to routine school fees.
- Funds received from the District, Provincial, or National education offices

specifically to support the school's computer system.

- Special grant funds received by the school in response to a grant request or proposal to support the school's computer system.
- Income generated through the use of the computer facility on a fee basis by people outside the school.
- Funds or the value of in-kind support from foundations, mosques, churches, local companies, individuals, or groups to support the school's computer system.
- Funds or in-kind support from the PTA to support the school's computer system.

Not all schools receive funding or in-kind support under each income category, so you can leave some categories empty. However, it is important to include all of these possible income categories in your financial report even if the value is zero, since this may change in the future. Also, the total amounts reported on both the expense and income reports may not be the same. The school may be spending more to support the computer system than it collects. If this happens, the school's accountant or finance officer should explain the difference in the amount of money spent on the computer system and the money collected to cover these costs.

The accountant and the school principal may also want to place the totals on this financial report into context by comparing the expenses and income for the computer system to the overall school budget and specific component budgets.

The SPT will want to discuss this financial report, especially where expense and/or income categories have no associated values. Also, if the totals on the two parts of the report are not equal, it is important to

understand why. In addition, the SPT may wish to discuss the following questions:

- Is the budget for buying new computer equipment sufficient to meet the school's needs?
- What area of the budget do members of the SPT feel is most important to achieving sustainability?
- Can members of the SPT identify any links between the report describing the current state of the school's computer system and the amount of money budgeted to support the different parts of such a system?
- Is income from school fees allocated to support the computer system sufficient to meet needs?
- Does the school have a capital improvement budget that could be used to increase the number of computers at the school, repair existing computers, or provide all teachers with training in using computers to improve teaching and learning?

How can we maintain our valuable computers without spending a lot of money?

While depending on companies or consultants to provide maintenance and support services for all the needs of a school's computer system is usually too expensive for public schools, not maintaining and repairing the computers can be even more expensive. There also may be no local sources of computer technical support or repair services for rural schools and schools in small towns in some countries. This factor, along with the high cost of computer maintenance and repair, often causes schools to neglect routine maintenance. This can lead to increased failure rates as poorly maintained computers break down. Then, when the computers

stop working, schools often do not have sufficient funds to buy expensive parts, pay technicians to repair the computers, or replace them with new ones if they cannot be repaired. Even when schools have staff with the skills to repair computers when they fail, there is still the problem of providing ongoing preventive maintenance. For the vast majority of public schools, depending on external sources for maintenance and repair is not a viable solution for enabling schools to keep their computer systems running well.

One solution to this problem that has been implemented successfully in the six Indonesian schools that participated in the Qualcomm Wireless Reach™ pilot project and elsewhere in the world is to establish Student Support Technician Clubs (SSTCs). This approach has three main advantages. First, it establishes a self-sustaining

means of providing daily maintenance and diagnosis for the school's computers. Second, the students who join SSTCs gain valuable ICT and employability skills that will be beneficial after they graduate. Third, it provides teachers, who want to use the school's computers with their students, access to a "computer aide" who can provide immediate technical support during a lesson.

What is an SSTC?

An SSTC is a club comprising students in the upper grades of the school who, after going through a simple orientation program, take on the responsibility of daily maintenance for the school's computers. Each SSTC has two teacher-sponsors who are responsible for establishing and running the club. These teacher-sponsors do not need to be computer experts, but a school's information technology (IT) teacher and/or the lab technician is often one of these sponsors.



An SSTC from one of the five rural schools in Southern Sumatra that participated in the Wireless Reach pilot project.

It is important that at least one of the SSTC teacher-sponsors is a regular subject teacher.

How can you establish an SSTC?

Starting an SSTC at your school is not difficult. The first step is to recruit the two teacher-sponsors who will be responsible for starting and running the club.” The school principal must also decide that having an SSTC in the school is a priority to ensure that these teacher-sponsors and the students who join the club take their responsibilities seriously. Once the teacher-sponsors have been identified, they need to use the **SSTC Background** document, which can be found in the Toolkit’s Annex and on the CD, to create a version of this information sheet about the SSTC that teacher-sponsors can distribute to other teachers and to the students who want to join the club.

The teacher-sponsors also will need to create a localized copy of a poster and/or handout using the **SSTC Club Announcement** in the Annex and on the CD. This will enable them to recruit about 12 students from one of the upper grades at the school to form the first core membership of the SSTC. We recommend that the school recruit the first group of students from either the second-to-last or the third-to-last grade. For example, in the case of a middle school (grades 7-9), the students should be recruited from the 8th grade. In the case of a primary school (grades K-6), consider recruiting students from the 5th grade. If the school has both boys and girls, it is important to recruit an equal number of each to the SSTC. The teacher-sponsors should seek some of the best and brightest students in the school to be core members of the SSTC.



This is the SSTC identify card that club members in all Macedonian schools use.

What are some features of a successful SSTC?

No two SSTCs are identical. Each school and each pair of sponsors, along with the members of the club, will create a unique SSTC that meets the needs of the school and reflects the school community. While all SSTCs will be different in some ways, SSTCs in different countries share characteristics that contribute to their success. Some of the more important characteristics of success include:

- The principal, teachers, and parents actively support the SSTC.
- The school creates a flexible schedule to enable members of the SSTC to arrive early or stay late so they can carry out routine maintenance on the school’s computers.
- The school provides the members of the SSTC with some kind of identifying feature. This may include a T-shirt, as shown in the pictures of SSTCs in Indonesia, an ID badge as shown in the picture of an SSTC in Macedonia, or a combination of these.
- At least half of the students initially recruited to join the SSTC are girls.

Over time, the ratio of girls to boys may change. In fact, in some schools, more girls remain active participants than boys, and in others the reverse is true. This evolution in the makeup of the SSTC is natural; the goal is to make sure that students know the school wants girls and boys to have an equal opportunity to participate.

- The teacher-sponsors and the students in the club organize to develop the rules for their club and to elect members to lead it. The students must believe that the club is theirs and that they play an important role in running it.
- SSTC teacher-sponsors organize training and orientation sessions for the SSTC members on their functions as members of the SSTC and on the school's computer system.
- SSTC teacher-sponsors organize the IT Technical Support training/orientation for SSTC members. The school should ask its computer technician and/or IT teacher to lead these training sessions. An overview of basic technical support skills, provided in the **SSTC Background** document in the Toolkit's Annex and on the CD, can be used to help the students gain basic technical support capacity. If the school does not have a resident computer technician or an IT teacher, the principal should try to identify someone in the school community or from a neighboring school who can lead the members of the SSTC through these training and orientation sessions. Experience at other SSTCs shows that, through a process of discovery, SSTC students quickly learn much about maintaining, trouble-



This is the back of the shirt that one of the schools in Indonesia had made for their SSTC members.

shooting, and fixing computers on their own once they have a set of basic skills.

- Teachers and principals in the school call on SSTC members to help teachers use the school's computer facilities. In addition to having club members carry out routine maintenance on the computers, these students can help teachers with their classes in the computer lab. In some schools, when teachers want to take their classes to the lab for an activity, they contact one of the SSTC teacher-sponsors or the student leader of the SSTC to ask to have an SSTC member join the class in the lab to provide technical support. The teacher-sponsors or the SSTC leader selects a member who has permission to leave his or her class to provide technical support. This is one reason why the SSTC sponsors should try to recruit high-performing students to join the SSTC.

What kinds of maintenance and technical support do SSTC members carry out?

While SSTC members are all students with no formal training in maintaining and repairing computers (beyond the basic overview provided by the document in the Annex), they are very capable of learning and carrying out basic computer maintenance and technical support services. Also, experience with SSTC students in different countries shows that their natural curiosity, eagerness to learn, desire to help, and innate lack of fear of making mistakes give them a perfect foundation for learning how to maintain computers and provide technical support to their peers, teachers, and others. The following is a brief list of some of the main tasks SSTC members carry out:

CLEANING: One of the most important causes of computer failure in schools

in many countries is overheating of components, such as the hard drive and power supply, caused by excess dust covering parts that generate heat when the computer is operating. As a computer is used, the fans that draw air through the computer to keep it cool also pull in dust. This dust gradually accumulates over many parts inside the computer creating a blanket of insulation that prevents the different components from radiating heat as they operate. Over time, as the insulation layer of dust grows thicker, the temperature in the different components increases and they eventually fail. When this happens to hard drives, you usually need to replace the drive, which is expensive, and then requires a significant amount of time to reinstall the computer's operating system, software, and all of the original files.

Solving this problem is simple. The SSTC members simply have to periodically open up the cases and blow out the dust. This allows components to radiate heat efficiently and keeps the computer running cooler. The SSTC team also makes sure that the computers are situated to allow a free flow of air into and around the case to improve cooling. In addition to cleaning inside the computers, keeping the outside of the case, the monitor, mouse, and keyboard clean is another important SSTC team function. Keeping the lab environment clean helps minimize the accumulation of grit and dust, which also helps prevent problems from occurring and keeps the lab looking good.

POWER MANAGEMENT: Another common problem with maintaining computers in many countries is damage caused to different components, especially the computer's power supply, by fluctuating electricity and power outages and surges. Some schools have purchased expensive

uninterruptible power supplies (UPSs) and lower-cost surge protectors to help protect their systems (see Unit 3), but the problems persist. One simple solution the SSTC team can implement is to manually turn off the power to the computer room, and turn off all computers after the power failure occurs, and/or unplug all computers when the electricity goes off. Then, the power surge that usually occurs when the power is restored cannot damage the computer's power supply or other expensive components. A few minutes after the power is restored to the school and is stable, the SSTC team can turn on power to the lab and then plug all of the computers back in and restart each one. While this process is not always quick, the few minutes that it takes to do this saves having to spend money to replace power supplies and motherboards. In addition to the out-of-pocket costs, the school suffers educational costs since the damaged computers cannot be used until the damaged parts are replaced.

ANTIVIRUS: As students, staff, and others use computers, especially if they are connected to the Internet, it is common for viruses, spyware, and other types of malware to be installed on the systems. Viruses can also be transferred to school computers when users plug in their USB flash drives or connect their MP3 players. Infections can slow down the system and lead to a loss of files, damage the whole system, and/or lead to additional Internet charges. If the school has access to the Internet, the SSTC team can carry out routine, often daily, updates of antivirus and antispyware software to keep out the newest viruses. They also will periodically scan each computer, weekly or monthly, to catch and clean out any viruses or other malware that may have infected it. In doing this periodic check, the SSTC team can also clean off extra files, images,

and other digital garbage that accumulates as people use the system. This keeps the computers running smoothly and prevents any downtime or the need to pay for specialized repair services.

CHECKING PARTS: As a computer is used, some of the parts inside the case can become loose, which eventually may cause failure. SSTC team members can solve this problem by routinely detaching and reattaching parts so they remain tightly fixed.

DIAGNOSING PROBLEMS: A final activity SSTC members carry out is to diagnose problems. Many such problems can be prevented and solved as described above. However, when a more serious problem occurs, the cost of the repair can often be much lower by having the SSTC team first determine what the problem might be and what solutions might be needed. Experience in schools with SSTCs shows that this diagnostic work can make it possible to quickly buy the needed parts, which the SSTC students then install under the guidance of the school's IT instructor or technician.

How is the SSTC sustained over time?

Schools need ongoing computer maintenance and technical support. Only one semester or year of support is not very useful. It is essential that the SSTC is sustained over time so the school's computers are maintained consistently and the effort and expense of establishing the SSTC is not lost. Initially, the leadership of the school must focus energy, attention, and resources to keep the SSTC operating. Eventually, the SSTC will be woven into the fabric of the school and the community, and sustaining it will become much easier.

One feature of the SSTC approach is designed to help the school sustain the club.

Toward the end of the first year of operation, approximately two months before the school closes for the year, SSTC members recruit new members from a grade or two below them. These new members will become Junior Technicians, and the initial members will become Senior Technicians.

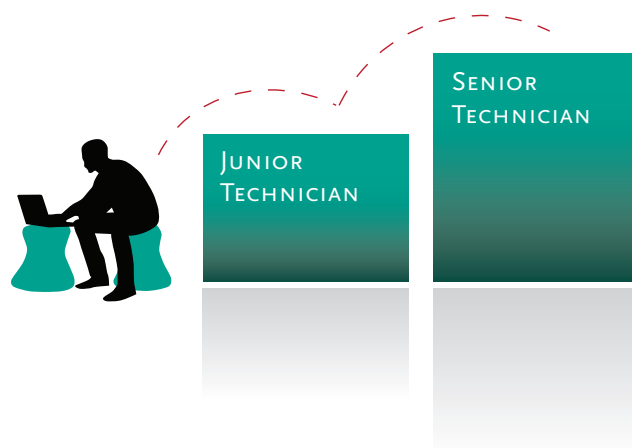
The Senior Technicians will be responsible for training the Junior Technicians in the roles and responsibilities of the SSTC. Each Senior Technician will be paired with one or more Junior Technicians as a mentor and will work with these new technicians so they learn their responsibilities quickly. At the start of the new school year, the expanded SSTC will be ready to perform essential services. Then, when the Senior Technicians approach their graduation, the Junior Technicians will be ready to become Senior Technicians and recruit a new group of Junior Technicians. In this way, the SSTC becomes a self-sustaining computer support program.

One reason for doing this is that students in their last year of school often have additional responsibilities linked to graduating, so the time they have available for their SSTC roles may become limited. The Junior Technicians will be able to take on greater responsibilities as the Senior Technicians become



increasingly busy with other activities. Then, at the end of year two, the Junior Technicians become Senior Technicians, and they recruit new members to the Club to become Junior Technicians. The sponsors of the club are not responsible for sustaining the Club, the students are. The sponsors only need to monitor this process and make sure it happens at the best time in the school year.

Another feature of the SSTC that contributes to its sustainability is making the leadership of the club part of the SPT. The SSTC lead-



ership (elected by the members), along with their sponsors, should participate in SPT meetings and present reports on the status of the school's computer system to the team and the school principal. Having this role on the SPT will contribute to efforts to sustain the SSTC.

How can the SSTC help support our school's efforts to integrate the use of computers into all subjects?

A computer system is a costly asset for a school to buy and even more costly to maintain and grow over time. It is essential, therefore, to make the best possible use of your system to improve teaching and learning across the whole academic program. Doing this is challenging. One of the most difficult challenges to overcome is encouraging teachers, many of whom may be unfamiliar with computers, to use them regularly in their course(s). SSTCs are helping some schools address this challenge by enabling one or more of their members to accompany teachers into the computer lab when teachers want to use the computers in their program. SSTC members make sure that all the computers are prepared for the teacher's lesson and assist students who might be having problems with technical aspects of the activity so the teacher can focus on teaching his or her lesson. If problems with connectivity or equipment occur, the SSTC member can also work to solve the problem, again leaving the teacher free to focus on the lesson. When teachers know they don't have to be computer experts, and there is someone they can depend on to solve technical issues, they are usually much more receptive to using a school's computer system in their lessons.

Enabling SSTC members to provide technical support for classrooms that use the school's computer lab requires the school

to establish a policy allowing members of the SSTC to leave their classes occasionally for this duty. This also requires that teachers who want an SSTC member's help to request it two or three days in advance so the student manager of the SSTC can determine which club member would be best suited for the task and can miss a class period. The SSTC member would then have to request permission from his or her teacher to miss the class. Generally, only those SSTC members who are doing well in a class are permitted to miss class to help another teacher use the computer lab. As a result, it is common for SSTC members to be among the best-performing students in school.

How do students benefit from joining the SSTC?

The most obvious benefit from being a member of an SSTC is the opportunity to gain more computer skills. Members of the SSTC also gain valuable leadership skills since they have important responsibilities to maintain the school's computer system and help teachers integrate computer use into their lessons. They also gain a useful mix of employability skills because they carry out the club's activities in a way that is similar to how technical support service companies run their business. These skills will make SSTC members more competitive in securing future employment. Proof of this comes from the fact that some SSTC members have taken the skills they learned in the club and started small, part-time, technical support businesses.

During the transition from one year to the next, Senior Technicians gain additional skills when they take on the responsibility of preparing new recruits to become effective Junior Technicians. This process not only reinforces their own knowledge, but they



also gain valuable experience in helping others learn and in helping to manage other activities in the club.

Assessments of SSTCs in other countries show that members greatly enjoy being involved in the club and they rarely drop out.

In some schools, the demand to be an SSTC member greatly exceeds the school's need and the capacity of the club leadership to manage the club. It is clear that students in these schools are showing they believe that being a member of the SSTC is important and beneficial.



COMPUTER SYSTEM SUSTAINABILITY TOOLKIT

UNIT 7:

Generating Income

7



Solving the problem of securing sufficient money to sustain your school's computer system is one of the most important functions of the SPT. This unit will help the SPT develop a plan to raise the funds and generate the income needed to sustain the school's computer system.

How might we use our valuable computer resources to generate revenue to help us maintain and grow our computer system?

Establishing and sustaining your school's computer system can be an expensive commitment. While some or all of the funds needed to buy the computer equipment for your school's system may have come from the Ministry of Education, donor organizations, private companies, or parents, these same sources probably will not provide the funds needed to maintain your system. Since your school may not receive sufficient funds from the government or school fees to operate the school and to sustain your computer system, your school's computers may break down and become too expensive to repair. To prevent this from happening, your school must find additional resources to pay the recurring costs of using your system, of maintaining the school's computers so that they continue to deliver educational benefit, and to grow the system to meet increasing demand from students and teachers.

Where can we get the extra money needed to sustain and grow our computer system?

Solving the problem of securing sufficient money to sustain your school's computer system is one of the most important functions of the SPT. This unit of the Toolkit

will help the SPT develop a plan to raise funds and generate the income needed to sustain the school's computer system. As a first step in this process, we suggest that the SPT hold a brainstorming session to list multiple ideas for each of the following fundraising categories.

How should we run our brainstorming session?

Brainstorming as a group can be a very good way to generate solutions for a problem. Successful brainstorming sessions often have the following characteristics:

- They provide clear guidelines for the purpose of the brainstorming session so the ideas generated will help you achieve your objective.
- During the brainstorming activity, all ideas should be written on the board or flip chart without comment or judgment. If people feel their ideas will be judged, they will be reluctant to share them. The goal is to first collect as many ideas as possible. Later, the group can discuss and judge each idea and select those that are best.
- It is okay to ask clarifying questions so everyone understands the idea clearly.
- It is critical to seek out many different ideas since there is no single solution

[BRAINSTORMING BEST PRACTICES]

Provide clear guidelines for the purpose of the brainstorming session

All ideas should be written on the board or flip chart without comment or judgment.

It is okay to ask clarifying questions so that the idea is understood by everyone.

It is critical to seek out many different ideas since there is no single solution to this problem.

It is often easier for people to brainstorm in smaller groups.



to any complex problem. The ultimate goal should be to come up with a set of different activities that together will enable your school to generate sufficient funds to maintain and grow your computer system.

- It is often easier for people to brainstorm in smaller groups. Therefore, you may want to divide the SPT into two or three small groups that go off into different rooms for a specified time to brainstorm. Then, the whole team meets so each small group can present the results of their brainstorming and explain its ideas. Some ideas probably will be common to all teams. This will help the SPT identify ideas with the greatest potential to raise the money needed.

Are there other ways the SPT can generate ideas to raise the money needed to sustain our computer system?

In addition to having the SPT engage in brainstorming about this topic, the SPT may want to consider holding a school-wide contest for fundraising and income-generating ideas. The individuals who submit the best ideas, as judged by the SPT, would receive prizes. Such a contest should be organized by grade level so students of similar ages compete among themselves. The students should be encouraged to talk about the contest with their parents and local business people as part of the process of generating quality ideas. It could also be useful to have students form teams of two to four members to come up with well-developed ideas. Since you want to receive only the best ideas, allow each team or person to submit only one or two.

The SPT should prepare an **Idea Submission Form** outlining the rules of the contest and including a template for each idea so students are required to think through

different aspects of their idea carefully. An **Idea Submission Form** template is included in the Annex and on the accompanying CD that you can use to create your own version. Using a specific form also will make it easier for the SPT to judge the different entries.

How are other schools raising money and generating income to sustain their computer systems?

Below are three categories of ways that other schools have used to raise money for their computer systems:

Supplemental and recurrent school fees.

Some schools have established a special computer use fee that all students must pay. While this fee is usually quite small, since all students pay it each semester or year, it can provide a predictable core fund to cover basic operating costs for the computer facility. In one example, a school used this computer use fee to buy fuel for the generator to run the computers. In another case, the fees were used to pay half of the salary of the school's IT technician.

To establish such a fee, it is important for the SPT to meet with the parents to discuss its purpose and how it will be managed and to gather suggestions on how much to charge. It would be important as well to develop a set of rules for this fee to ensure that it is used only for the computer system. Since some families may have great difficulty paying this additional fee, the SPT will want to establish some kind of waiver policy so those who cannot pay are excused from the fee. In one example, the school included in-kind donations as a replacement for cash payments for families that had difficulty paying cash.

Special fundraising events and activities.

Some schools have organized successful

Sample: Fundraising Idea Submission Form



TEAM INFORMATION

Names of team members:

Karina John
Neha Alex
.....

Grade Level or age: 5th grade

TITLE OF YOUR FUNDRAISING IDEA

FUNDRAISING DINNER FOR THE SCHOOL COMMUNITY

SUMMARY DESCRIPTION OF YOUR TEAM'S FUNDRAISING IDEA

We will invite teachers, parents, and other community members to have a dinner (cooked by students) and talent show with music and dancing performed by students. We will ask for community members to donate food and time to help prepare the dinner meal. We will sell tickets to school staff, other students, parents and community members. All ticket proceeds will be 100% revenue to support the school's computer system.

What funds, equipment, people and other resources would be needed to implement your idea?

We will use the school's kitchen to prepare the food. Volunteer adults (parents) will help students to prepare the meal. A team of students will seek donations of rice, meat and vegetables to prepare the meal. Students will volunteer to dance and sing for the talent show. We will also need to set up tables and chairs at the school. We will try to use tables, chairs and dishes that the school has. If this is not enough, we will borrow items we need from community members. We will need to print and sell tickets to the dinner and talent show. We will need to develop advertising posters and post these at the school and around the community to promote the dinner and talent show.

How much money would be needed to plan and implement your idea?

If people donate food and their time, we think it will cost only \$500 to produce advertisements, tickets and cover the costs of things that won't be donated.

What equipment and/or materials would be needed to plan and implement your idea?

We will need food, tables, dishes, paper and ink to print posters and tickets, microphones and stereo for student show.

How many people and what skills would be needed to plan and implement your idea?

We will need at least 6 adults to help with preparing the food. We will need 10 students to cook and serve the dinner and clean after the event. We will need 5 students who will be primarily responsible for planning and managing this event. We would need to recruit at least 10 talent acts for the show and a team of 3 judges to judge the talent show.

What other resources and school/community facilities would be needed to implement your idea?

We will use the school's kitchen to prepare the food, and also the school's sports field to set up the tables and host the talent show event.

How much time would be needed to implement your idea?

We will need one week to prepare a detailed plan for the event. We would need a week to prepare advertisements to promote the event and to recruit students to perform at the talent show. During this week, we will also need to get people and businesses to donate the food for the dinner. We would need a week to sell tickets to the event. During this week students will prepare their dances and songs routines for the talent show. It will take one day to set up and hold the dinner.

Who in the community (staff, students, parents, other community members) would participate in your idea?

Students would help with the talent show, cleaning, cooking and serving food. Teachers will help with advertising and printing tickets. Teachers, parents and other community members will help with donating food and preparing food. Teachers and students will sell tickets for the event. All members of the community are welcome to buy tickets to the dinner and talent show.

How long will this activity last for? The dinner and talent show would last one day.

If successful, could your idea be repeated? Yes.....

How often? Twice a year.....

How much total money do you think your idea would generate? \$1,000.....
(show your calculations)

$$\$10/\text{ticket} \times 100 \text{ people} = \$1,000$$

How much net revenue do you think your idea would generate? \$500.....
(show your calculations)

$$\$1,000 - \$500(\text{cost}) = \$500 \quad (\text{enough for one new computer})$$

What level of market demand is there for your idea?

There are many people in the community who support the idea of improving our computer labs. We think that there will be many people interested in buying tickets to this dinner and talent show since it is not very expensive, they will support student's talents, and help buy a new computer for the school.

How did you determine market demand for your idea?

We asked about 50 people in the community if they would be interested in buying tickets to such an event. Of these 50 people, 42 said that they would pay \$10 for a ticket to the event. Since there are more than 400 adults in our community, we think that at least 100 would attend this event.

special events for which people buy tickets to attend, with proceeds from ticket sales used to pay for specific needs of the computer system. For example, some schools have organized events to raise funds to buy new computers or to repair several of the school's computers.

To increase the funds that can be raised and reduce the labor and material costs of raising funds, some schools organize annual events to support their computer system. In one case, the school's PTA organized an annual dinner for members of the community, and students (SSTC members) sold tickets to parents and other members of the community. Members of the PTA and local businesses donated food for the dinner so all proceeds from ticket sales went to support the computer system. In another case, a school organized a community dance each quarter. Again, students sold tickets to parents and others to attend. In this case, the school used proceeds from the ticket sales to help cover the cost of Internet access. In a final example, the SSTC in one school organized an annual auction. Families, businesses, and individuals donated items that the SSTC auctioned to people attending the event. Since everyone understood the purpose of the auction, the prices bid on the items were higher than what would normally be the case. Also, some of the items put up for auction were humorous. Other items were useful, such as math tutoring, washing someone's car, a one-time computer service provided by SSTC members, etc. At this school, the annual auction provided funds that were used to buy spare parts and to upgrade the antivirus software.

Selling computer use and training services to members of the community: In many communities, the school has the only computer lab. This scarcity makes this asset

valuable and provides schools with the opportunity to use their computer system during non-school hours to generate revenue through access fees. Some schools convert their computer labs into fee-based public access facilities in the evenings and on weekends. The fees charged to community users cover the costs incurred in running the after-school public access facility (electricity, connectivity, maintenance, staffing, etc.) and generate a surplus that is paid into a computer system support fund. Other schools have organized fee-based training programs for community members, local businesses, and neighboring schools. Again, the fees collected from these training programs cover all of the costs to run the program (electricity, connectivity, maintenance, training materials, trainers, etc.) and generate a surplus that is paid into the school's computer support fund. Some schools operate both public access and training programs to optimize the generation of income from their computer facility during non-school hours.

Most schools have little or no experience setting up and running income-generating activities like those described above. Some schools have addressed this issue by working with private companies and entrepreneurs to organize and run such activities. The company or entrepreneur then pays a fixed fee or percentage of gross revenue to use the school's facilities. This approach reduces the management burden to organize and operate the activities and guarantees a specific amount of revenue.

Experience shows that when schools use their computer facilities to generate revenue during non-school hours, they become much more serious about maintaining their computer system since customers will not pay to use computers that do not work. As a

result, using school computers to generate revenue can create a powerful incentive to keep the computer system operating well, maintain an Internet connection, and grow the system to meet the needs of the school and attract more customers.

Are there any really important things we should keep in mind as we explore using our computer system to generate income?

YES! There are several very important factors your SPT should keep in mind when you explore using your school's computer facilities to raise money. The following are a few things schools in different countries have found important:

Transparency and Accountability: Raising money from the use of public school resources to support schools and school assets is a very delicate matter. It is therefore critical that the SPT and the school's leadership make sure all discussions about fundraising ideas; all plans for specific activities; all policies guiding these activities; and all records of costs, income, and surpluses be publicly available to the entire school community. Once members of the community start to suspect that something might not be right with how money is being raised, managed, or spent, even if there is nothing wrong, the school will quickly lose public support and the ability generate needed funds.

The best SPTs do not just have an open door policy; they actively share information with teachers, students, parents, and others. This goes beyond simply encouraging people to attend meetings and includes publicly posting the accounts from a fundraising activity, showing everyone what it costs to run the school's computer facility, and reporting quarterly to the community how funds that were raised have been spent. An

example of this proactive sharing of financial information is provided in the testimonial at the start of the Toolkit by Mr. Arman, the Principal of SMAN 1 Buay Bahuga Public School in Southern Sumatra, Indonesia. In addition to preventing people from suspecting wrongdoing, a high level of transparency can encourage greater community participation in fundraising efforts.

Diversify: The most successful fundraising efforts include multiple types of activities. It is not wise to "put all your eggs in one basket." If you decide to implement only one idea, if that idea does not work, you will have nothing to fall back on. Also, it is better to generate small but dependable levels of income from multiple sources that add up to meet your needs, than to risk not securing sufficient income from only one or two sources. Experience shows that multiple activities and events involve a broader spectrum of people in the school and the community, creates a larger group of stakeholders who have an interest in sustaining the school's computer facility. This will increase your chances of success and contribute to a stronger school.

Enable Broad Participation: Successful fundraising efforts are time-consuming and depend on a variety of skills. If only a few participants in the school are responsible for organizing and running fundraising events, these events probably will be less successful. Actively involving a broad array of people from the school and the surrounding community, and giving these people substantive responsibility for planning, organizing, and running the events, will lessen the burden placed on just a few key people and result in greater success in the short and long term.

THINGS TO KEEP IN MIND WHEN FUND RAISING:

*Transparency
+
Accountability*

Diversify

Innovate

*Broad
Participation*

Innovate: Just because the idea has never been tried before in your school or the community does not mean that it will not work. For example, the school mentioned earlier that held a dance for parents and other adults in the community had never done it before. The people involved were very nervous about spending time and scarce resources on organizing and promoting the event. One staff member believed in the potential of holding a dance and took the lead. The dance proved to be a great success, and the school raised enough money to pay for its Internet access for the year. Parents and others had a wonderful time and were very pleased to pay the higher-than-usual ticket price to attend the dance so the school could raise the money it needed. As a result, the dance became a regular event and now raises more money than it first did. The SPT should consider all ideas, carefully, test the most promising, and think beyond the conventional.

How can we decide which revenue-generating strategies to implement at our school?

Brainstorming to come up with a wide variety of ideas to generate the needed income to sustain and grow your computer system is only part of the process of creating financial sustainability. The SPT will have to sort through different ideas to determine which have the greatest potential for success; which might generate the greatest net revenue; and which the staff, students, and community members would be able to implement within the school's context. It is important to keep in mind that all fundraising activities require significant amounts of time and effort from multiple people, and that all the people who need to be involved are already quite busy. Essentially, not all ideas are created equal. So how do you decide which ideas to invest in and which

to ignore for the time being? One approach that has proven useful for other schools is to rank the available options.

How can we rank the different options?

One approach to ranking the different options is to create a matrix similar to the one shown on the next page with each option you come up with from your brainstorming session along the left and different ranking criteria along the top. Each member of the SPT would take a copy of the blank ranking sheet and enter scores (such as 1-5) in each of the cells, with "0" when an option is not applicable. Number 1 would be the worst score for the option, and 5 would be the best. After each item is ranked for each criterion, each member adds up the total scores for each fundraising idea and enters this in the total column. When each member is finished with his or her ranking, the team creates an average score from each possible activity and sorts these from highest to lowest. To make this easier, one member of the team could enter the average scores into a spreadsheet such as Microsoft Excel and, if the school has a projector, the results can be projected for all to see.

The Toolkit's CD includes a blank **Fundraising Ideas Ranking Matrix** that can be completed with the SPT's ideas. The suggested criteria for ranking each idea also can be edited to meet the needs of the school. Once the blank matrix is complete, it can be printed and distributed to the members of the team.

Once the sorted rankings are presented, the team can discuss the results and make any adjustments its members feel are appropriate to the relative ranking of each idea. When the team feels the resulting rankings accurately reflect its members' judgment, it can decide which top-ranked ideas the



Not all ideas are created equal. Select one that best fits your specific needs.

Sample: Fundraising Ideas Ranking Matrix

Fundraising Ideas	Community involvement	Uses ICTs	Net Revenue Potential	Recurrent Revenue	Labor Required	Money Required	Calendar Dependent	Total Scores
	(5=most involved)	(5=most use)	(5=greatest net revenue)	(5=continuous revenue)	(5=lowest labor)	(5=least investment)	(5=no dependence)	
Special ICT school fee	4	1	3	1	3	3	5	20
ICT public access facility	3	5	4	4	1	2	3	22
Special event (e.g., auction)	5	3	4	4	1	2	2	21
Fee-based training offered	3	3	1	5	3	2	3	20
Sponsorship program	2	4	4	3	1	2	4	20

school will implement first. It is important to remember that this ranking tool can only help you distinguish among different ideas; the tool cannot make the final decisions for you. In the end, the judgment by the SPT of which ideas are the best is more important than the relative ranking of the ideas.

It is also important to remember that you should seek optimum solutions that have the maximum level of **net revenue** (total income minus costs) and need the lowest level of labor and complexity to implement.

How can we estimate how much net revenue we may earn for each income-earning strategy?

One of the most common mistakes schools make when running income-generating activities is assuming that the cash earned is profit the school can use for the purpose of the event. Unless there are no costs involved

in running an activity, you must subtract the value of these costs from the income to determine whether the activity generated a profit or surplus. In some cases, the cost to run the activity can exceed the amount of money that was generated, leaving the school with a deficit.

To prevent this from happening, it is important to estimate the net revenue for each idea. Your school's accountant or finance officer probably can help the SPT estimate the potential net revenue for each of your income-generating ideas. The process of estimating net revenue for fee-based services using the school's computer system is divided into two parts. First, you must determine the different costs involved in planning and running each fee-based activity. Second, you must determine the level of income the activity is expected to generate through charging

fees. Then, by subtracting the total costs from total income you will know whether you are breaking even, generating a surplus, or operating at a loss (that is, negative net revenue).

The formula for this is:

$$\begin{array}{r}
 \text{Total Income} \\
 - \text{Total Costs} \\
 \hline
 \text{Net Revenue}
 \end{array}$$

For activities that use the computer system to generate income through fees, it is essential to generate a surplus. A sample calculation from a school in Indonesia for a single fee-based training activity using a school’s computer systems is presented below:

\$11,851.00	TOTAL INCOME
– \$ 8,357.60	TOTAL COSTS
\$3,493.40	NET REVENUE

In this case, the school is generating a surplus of \$3,493.40. While this may not seem like a lot of money, this surplus can help cover the costs of using the school’s computer system for educational purposes, and this surplus can be added to the surpluses from other activities to help sustain the school’s computer system.

When estimating net revenue, it is important to keep in mind that there is also the non-

financial value from running a training course for community members. The people taking the course will come to feel that having a well-run computer system in their school is important and they probably will support other efforts to sustain the system. For other fundraising activities that operate with volunteers and donations (where the school does not spend cash to generate money), this calculation is different. For these activities, you should compare the total estimated time of the volunteers plus the total estimated value of contributed materials to the income being generated. The goal is to carry out activities that generate much more money than the total value of the time and materials used to generate this money. At the same time, it is important to consider the value of the activity to strengthening school-community relationships. In the long run, a fund-raising activity that helps to strengthen relationships between the school and the community can be more valuable to the school and the computer system than one that generates more money but does not build better relationships.

What kinds of things should be included in estimating the total cost of running an income-generating activity?

This is very important question. Many costs are easy to estimate. For example, for a training course, the school will have to pay an instructor to prepare and run a 10-day training course over several weekends or over a school holiday. The instructors’ salary is a direct cost and easy to estimate. The school also may need to print copies of the curriculum or training guide for each participant. This can be estimated by calculating the printing costs. If a firm is hired to print the guide then the fee charged is the cost. However, if the school prints the guide itself, this is a bit more complex. You will

need to calculate the cost of the materials, such as the cost of paper plus the cost of ink or toner plus the cost of labor for the person who does the work.

Other types of costs involved in running a training course are not as obvious. The list below includes some of these other costs that are important to estimate:

- The cost of the electricity consumed by the computers, room lights, fans, and/or the air conditioner during the training course.
- The cost of Internet access, if used, for the training course.
- The cost of using the computers for the training course (This can be estimated by using the cost to use a computer at a cyber café for an hour).
- The costs, in terms of staff time (volunteer and paid labor), to plan and promote the training course.
- The cost for materials and services to promote and advertise the training course.
- The cost of staff time (the school accountant's) to make payments, collect fees, maintain accounts, and produce a financial report for the activity.
- The cost for security and other staff (paid or volunteer labor) who have to be at the school on the weekends, evenings, or during vacation to run the course.
- The value of the venue used to carry out the training course relative to its other possible uses.

The last cost element, the value of the room used for the training room, is difficult to estimate since a classroom is used and no rent is paid. Some people feel this cost element should not be included because it is a public space and paid for by public taxes. Whether this cost element is included in

estimating total costs is up to the school. If the school decides to include it, an easy way to estimate the value of this space is to determine what the school would need to pay to rent a similar space in the community.

Once these estimated costs are added together, you can divide them by the number of people who are expected to pay fees for the training program or other service. This will give you the fee that would have to be charged simply to break even and not lose money. You will then have to increase this “break-even” fee by some amount to allow the training course to generate a surplus. Once you calculate this fee, you can compare it to fees charged by commercial training firms to run similar training courses. The goal is not to charge fees that are greater than your “competition’s” since you probably will not attract many customers. At the same time, you do not want to charge fees that are significantly lower than those of commercial programs since this could be seen as unfair competition. In the example above, no private training programs for computers were offered in the village where the school was located, and the closest town that had courses available was a four-hour drive away. As a result, the school was offering a valuable service that was not easily available to members of the community.

The SPT will want to identify all possible cost categories and estimate the value of each fee-based revenue generating idea it is considering. This will allow the SPT to compare the net revenue earning potential for each idea accurately and to make good decisions about which ideas are best.



UNIT 8:

Maintaining Your Budget





Too many schools have seen their computer systems eventually unravel because they were unable to afford the ongoing costs required to maintain and upgrade them.

This unit will help you develop realistic income generating strategies to ensure the long-term health of your computer system's budget.

How can we determine whether our income-generating activities are creating a surplus and whether the net income is covering the cost to sustain our computer system?

Carrying out activities to generate revenue to sustain the school's computer system is only part of the process of sustaining the system. If you do not know how much money the school spends to operate the computer system and to carry out revenue-generating strategies, and how much total income is being generated, then you cannot determine whether the school is covering all costs or generating a surplus. Determining whether the school's computer system is operating at a profit or a loss requires that both total costs and total revenue be tracked carefully over time. It can take two or more years of tracking costs and revenue before you can draw any solid conclusions.

Carefully tracking total costs and total revenue from fee-based uses of the computer system will enable the SPT to determine whether the rates charged are sufficient to cover costs and produce a surplus. The school should not, over the long term, subsidize the cost of using its computer system to generate revenue. Only those strategies that quickly generate a surplus (that is, a **profit**) should be continued.

Schools that do not track actual costs and total revenue carefully often feel that if there is money flowing into the school from an activity, it is generating a surplus. Unfortunately, there are many examples where the activities were actually operating at a net loss. In other words, it was costing the school more to carry out the income-generating activity than the school was earning from the activity. Eventually, these schools discovered their mistake, but by the time they learned what they were doing, they had usually lost significant amounts of money. At the same time, they had lost the opportunity to carry out a different activity that could have generated a profit.

As with estimating the costs and potential revenue for different activities in Unit 7, the school's accountant or finance officer probably can help set up a system to track actual costs and income, and then to calculate total net revenue. The SPT can then use this information to evaluate each activity over time and make decisions about adjusting the fees charged, not continuing an activity, or replicating other activities.

The accountant can use the information gathered to estimate costs and income in Unit 7 to create the school's cost and revenue tracking system. The Toolkit's CD includes a draft **Cost and Revenue Tracking Template**

in the form of a Microsoft Excel spreadsheet you can use to create your school’s tracking system. This template includes example cost categories and income sources for a few possible revenue-generating ideas. You and your team will need to edit the categories and enter the estimates, and then over time record actual costs and revenue. The template will then calculate total costs and revenue and reveal whether the activity is generating a surplus. The template does not include a way to estimate the non-financial value of carrying out an activity; this will have to be done through discussions among SPT members.

In Unit 6, you calculated what the school was spending to operate its computer system without any income-generating activities. You can now use this information to enable the SPT to determine whether the total net revenue from all income-generating



Jing “How to!” Videos

The CD at the end of the Toolkit also includes a step-by-step instructional video for using the **Cost and Revenue Tracking Template**.

activities plus all fees charged to students for the school’s computer system is sufficient to sustain the computer system.

This involves a two-step process. First, use your **Cost and Revenue Tracking** system to add the net revenue from all income-generating activities together to calculate the school’s total net revenue. Add this figure to the total amount of money collected from student fees for using the computer system. Then compare this figure to the total cost to maintain the computer system and pay for all computer system-related services such as Internet access. If these costs are less than

COMPUTER EXPENSES	
Total Personnel Costs	\$12,980.40
Total Equipment Costs	\$3,520.00
Total Connectivity Costs	\$5,400.00
Total Cost for Maintenance and Repair	\$2,318.00
Total Cost of Electricity	\$2,400.00
Total Cost for Training Services and Materials	\$1,450.00
Total Cost for Fund raising and Income Generating Activities	\$2,120.00
TOTAL OPERATIONAL COST FOR THE COMPUTER SYSTEM	\$30,188.40
COMPUTER SYSTEM INCOME	
Total Income from Student Fees	\$14,000.00
Total Income from Government Grants	\$5,320.00
Total Income from Fundraising Events	\$155.00
Total Income from Income Generating Activity	\$2,500.00
Total Income from Donor Funded Activity	\$150.00
TOTAL INCOME AND REVENUE	\$22,125.00
TOTAL NET REVENUE	\$(8,063.40)

total income, your school is generating a surplus. The table on the previous page illustrates this process. In this example, however, the cost to operate the school's computer system exceeded revenue and therefore the school was operating at a deficit. This school needed to reduce costs and increase revenue so that there was no deficit and a surplus was eventually created.

Depending on the size of the surplus, you can use it to replace aging computers, buy additional computers to increase access at the school, buy new software, provide teachers with opportunities to receive computer training, and pay for other additions to the system.

Alternatively, if the school is spending more to maintain its system than it is earning from fees and income-generating activities, the SPT must reevaluate the Sustainability Plan and make adjustments.

As explained earlier in the Toolkit, it is critical to maintain all records of income and expenditures in a transparent way so students, parents, teachers, and other community members will be certain that all of the income the school generates to sustain the computer system is used efficiently and only for this purpose. If members of the community start to believe that funds are not being used properly, they will soon stop using fee-based services and probably will protest any special fees the school charges. To avoid this problem, we advise the SPT to make all records of income and costs related to sustaining the school's computer system public. We realize this can be a sensitive issue, but not being able to sustain and grow your computer system is a much more serious issue.

How can we promote and diversify our revenue-generating strategies?

After you have gained some experience in planning and running a few income-generating activities and have collected data on actual costs and net revenue, you will have a sense of which ideas are winners. At this point, the SPT probably will need to explore diversifying the number and type of income-generating activities. Also, for those activities that are generating a good surplus and creating a positive relationship with the community, the SPT may want to explore ways to increase the number of "customers" buying these high-value services. In combination, diversifying your income-generating services and increasing the returns from the most successful activities is the best way to achieve the long-term sustainability of your school's computer system.

A first possible step in diversifying your revenue-generating activities is to return to the list of possible activities you ranked to see whether your judgment about one or more of them that you did not try has changed since you have gained experience running income-generating activities. The experience you have gained from your initial income-generating activities, from tracking actual costs of maintaining the school's computer system, and from calculating the net revenue earned from activities, probably will influence your views about other income-generating ideas.

With this experience in mind, we suggest you repeat the activities you carried out in Unit 7 to identify new potential revenue-generating ideas and to reevaluate the initial ideas. This process should go more quickly and result in identifying one or a few additional activities the school and community can carry out that will likely be more successful.

In addition to increasing total net revenue, diversifying the income-generating activities the school carries out will reduce risk and ensure that revenue earned over time will remain stable. If your school only has a few very similar ways of generating income to support your computer system, a small change in the local, national, or global situation can quickly change positive revenue to negative. The greater the diversity in income-generating activities, the more stability and fewer risks you will experience. There is no way to eliminate risks, but diversity will reduce them.

How can we increase the number of “customers” who buy our services or participate in our fundraising activities?

One main answer to this question can be found on TV, radio, and most signs you see around the community—**advertise**. Another way to increase customers is to ensure that those who have *bought* your services in the past are happy with them. Experience shows that “word of mouth” marketing and personal recommendations from satisfied customers are two of the most effective ways to increase business and expand your customer base.

There are many ways to market the different income-generating strategies you decide to implement. The most basic is simply to use announcements and advertisements. Sharing information about the activity with the greatest number of people possible in your community and neighboring ones is key. One way for the SPT to identify the best ways to communicate your message is to carry out a brainstorming and ranking activity similar to the one you used in Unit 7 for marketing and communication ideas. Once you have selected the best ways to market and communicate, you have to come

up with what you will communicate—the message, or the content of the advertisement being shared via different media.

Successful advertising requires creative thinking and clearly understanding your customers. One way for a school to develop creative and effective advertising messages for different activities and customers is to get the help of teachers and students. Below is an idea for holding a contest that both generates creative ideas and creates an enjoyable educational opportunity.

An Advertising Contest: Similar to the contest discussed in Unit 7 to identify good income earning-generating ideas, this contest asks teams of students to come up with creative, realistic, and low-cost marketing ideas that might include messages, diagrams, pictures, movies, slogans, skits or songs, and that would both communicate about a specific activity and encourage people to participate. The contest’s guidelines must include:

- clearly stated objectives and descriptions of each income earning-generating activity, especially any fees, locations, dates, requirements, and benefits;
- the criteria that will be used to judge the advertisements;
- the minimum requirements for each advertisement;
- the time frame for the contest;
- the structure and size of the teams that are to compete, including age levels;
- the prizes that will be awarded to winning advertisements;
- how the contest will be judged; and
- the materials and mediums that can and/or cannot be used.



Radio, TV, ads



Ad space in newsletters



Flyers

Ideas for Promoting Activities and Services



Word of mouth and personal recommendation



Social Media like Facebook and Twitter



SMS Texting

Participants should be encouraged to use the school's computers to create their advertisements. The SPT may want to hold a drawing for the different activities so two or more teams will compete in each activity. Finally, the contest will need prizes. Judging the contest could be a public activity (which would also be a form of advertising), where each team would present its advertisement to the audience and judges. To make the judging exciting and participatory, the audience could be asked to score each presented advertise-

ment for each activity, and then the audiences' scores would be added to the judges' scores to select the best advertisements for each activity. In addition to being fun and providing the school with free advertising, this process would be educational since students would practice and gain important skills and knowledge. To enhance the project's educational value, the SPT could require each team of students to recruit a teacher or someone from the school or community to function as the team's sponsor and advisor.



COMPUTER SYSTEM SUSTAINABILITY TOOLKIT

UNIT 9:

Monitoring Your Plan

9



Now that you have started implementing your sustainability plan, you will need to make sure that it achieves your goals over time. To do this you will need to monitor progress to see if different aspects of the plan are working. This unit will help you track your progress, as well as to adjust your plan over time through explicit improvements and enhancements.

How do we know if our sustainability plan is working?

After you have developed and started implementing your sustainability plan, you will want to track its progress to see whether different aspects of the plan are working. This will allow you to adjust the plan over time to improve what is working and change features that are not functioning as you expected. To do this, you will want to develop a simple yet robust monitoring and evaluation (M&E) strategy for your sustainability plan.

A first step in developing your M&E strategy is to define indicators for each part of your plan. An indicator is simply a way for you to determine whether a specific part of your plan is working. An indicator will “indicate” or show you that the activity is or is not operating as planned. For example, if establishing and running an SSTC is part of your plan, then you may want to use some or all of the following indicators for this feature of your plan:

- The teacher sponsors were identified and recruited the first group of students.
- SSTC meets regularly and has created a schedule for maintaining the school’s computer system.
- SSTC keeps to its schedule and carries

out routine maintenance activities on the school’s computers.

- The number of computers that are not working each month (or other period of time) is less than in the past. (The Computer System Status Report will provide the baseline information needed to make this assessment.)
- The computer lab is kept clean and orderly.
- Teachers in the school are using SSTC members to help them when they take their classes to the computer lab.
- Toward the end of the first year of operating, the first group of SSTC members recruited the second group of younger students to become “Junior Technicians” in the SSTC, thus ensuring its continuation.
- SSTC has diagnosed more serious computer problems requiring external computer technicians.
- The number of times the school has had to use external technicians has decreased since before the SSTC was established.
- The number of problems with viruses on the school’s computers has decreased since the SSTC was established.



Jing “How to!” Videos

The CD at the end of the Toolkit also includes a step-by-step instructional video for using the **M&E Tracking Template**.

Each part of your plan will need to have a set of indicators so the SPT will be able to track progress and identify difficulties before they become problems. The Toolkit includes an **M&E Tracking Template** you can use to identify and list milestones and indicators for each part of your plan. The M&E template also includes a column for you to list the type of data each indicator would collect. The sample template includes the different parts of the plan that were covered in the Toolkit and a few sample milestones and indicators. You will create your **M&E Tracking Form** by modifying the template and adding the milestones and indicators you want to track.

Once you have created your own **M&E Tracking Form**, you will need to create a

system for using the form to track indicators over time. One way to manage tracking different plan elements and indicators is to assign a two-person team comprising members of the SPT to one or more of these elements and their corresponding indicators. These teams then would report to the whole SPT during meetings. This lessens the difficulty of monitoring the plan and enables all SPT members to be part of the process of deciding how to adjust the plan over time.

One really important part of the SPT’s M&E plan is tracking costs to use, maintain, and grow your school’s computer system and any funds collected for your computer system or revenue earned from income-generating activities with or for your computer system over time. This financial tracking of costs and revenue is critical to the success of any sustainability plan. We suggest that, at the start of each SPT meeting, the finance officer distribute a simple monthly financial report showing monthly costs and revenue and any changes in the financial status of your school’s computer system during the year.



Sample:
M&E Tracking Template

Major Milestones	Person(s) Responsible	Deadlines	Completed on	Results	Challenges	Planned Next Steps
Teacher sponsors were identified	Mrs. Smith	Sept 3	Sept 3	2 sponsors found	None	Recruit Students
Students recruited	Mr. Reid	Sept 18	Sept 15	All 12 students recruited	None	Organize first meeting
SSTC has schedule for maintaining school's computer system	Mr. Reid	Sept 30	Sept 28	Schedule set	None	Make sure schedule is followed
Initial computer system status report completed	Mrs. Smith	Oct 10	Oct 7	Report complete on schedule	10 computers not working	Develop schedule for SSTC maintenance
SSTC recruited new class of Junior Technicians	Mrs. Smith	Apr 15	Apr 15	15 new students	Can only accept 12	Accept final members
Follow up computer system status report completed	Mrs. Smith	May 15	May 15	Only 1 computer not working	1 printer is now not working	Report progress to SPT

Ongoing indicators	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug
Number of times the school has used external technicians	3	3	2	1	0	0	0	0	1	0	0	0
Number of problems with viruses	25	25	23	8	2	0	0	5	2	0	0	0
Computer lab is clean and orderly (enter date checked)				15/10	10/11	3/12	15/1	18/2	13/3	14/4	10/5	4/6
Number of times teachers are using SSTC members for help	0	0	0	0	1	1	1	2	2	4	5	5
Number of times SSTC has carried out routine maintenance	0	0	0	3	4	6	6	6	6	6	6	6
Number of times SSTC has diagnosed more serious problems	0	0	0	1	0	0	0	0	1	0	0	0
Number of computers that are fully operational	10	8	12	14	18	20	20	19	20	20	20	20
Percent of computers that are fully operational	50%	40%	60%	70%	90%	100%	100%	95%	100%	100%	100%	100%

In addition to tracking quantitative features of your school's sustainability plan, it is important to track qualitative features of the plan. For example, one of the main goals of any sustainability plan is to improve the use of your computers across the curriculum. Another important objective is to improve the relationship between the school and the surrounding community (that is, parents and local businesses). A final important objective is to improve student access to computers and the Internet. You can track this by noting the average number of hours per month students in different grades use the computers as well as the diversity of use between conventional computer literacy classes and uses for other subjects.

Combining the mix of quantitative results with qualitative benefits will give you a fairly complete understanding of how well your plan is doing over time. Some qualitative features of your plan may show a positive change sooner than do the financial aspects of your plan. Then, as the

plan progresses, improvements in student, teacher, and community satisfaction with the state of your computer system probably will lead to improvements in the system's financial situation. No single element of your sustainability plan will result in your computer system's becoming sustainable, so it is important to monitor all of the main elements of your plan to gain a complete understanding of progress.

At the end of each year, the SPT should integrate results from periodic monitoring of the different elements to create a comprehensive summary of the status of the school's sustainability plan. You should share this summary with all staff, students, parents, and other community members at some kind of school-wide event. Even slight improvements in the state of your school's computer system can translate into greater interest on the part of the larger school community in making more improvements and seeing your school as an important local institution.

Notes:

Handwriting practice lines consisting of 30 horizontal dashed lines.

Annex

Sustainability Planning Team Meeting Agenda Template

Sustainability Planning Team Calendar

Connectivity Research Data Sheet

Computer System Status Assessment Report

Assessment Report Template

Computer Usage Survey for Students

Computer Usage Survey for Staff

Computer Usage Survey for Community

Focus Group Discussion Guide

Student Support Technician Club Background

Student Support Technician Club Announcement Template

Fundraising Idea Submission Form Template

About Cisco Networking Academy

Sustainability Planning Team Meeting Agenda



Date:



Time:



Meeting called by:



Proposed Participants:

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Proposed Agenda Items:

TIME

TOPICS

TIME	TOPICS
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Additional Instructions:

Sustainability Planning Team Calendar

WEEK 1

WEEK 2

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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JANUARY

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FEBRUARY

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MARCH

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APRIL

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MAY

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JUNE

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JULY

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AUGUST



Important items to remember:

1. Computer System Assessment, 2. Focus Group Discussions, 3. Brainstorm & select fundraising ideas,
4. Develop CSS plan, 5. Develop cost & revenue systems, 6. Develop monitoring and evaluation strategy

WEEK 3

WEEK 4

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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JANUARY

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FEBRUARY

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MARCH

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APRIL

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MAY

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JUNE

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JULY

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AUGUST

Connectivity Research Data Sheet

TECHNOLOGY OPTIONS	AVAILABLE? YES/NO	SPECIFICATIONS / SPEEDS	ESTIMATED ANNUAL COST	COMMENTS
Dial-up				
ISDN (Integrated Services Digital Network)				
DSL/ADSL (Digital Subscriber Line / Asymmetrical Digital Subscriber Line)				
Cable				
WiFi/WiMax				
Cellular-based: GPRS, EDGE, CDMA 2000, EVDO, G3, etc.				
Satellite - VSAT				

Assessment Report Templates

School: _____

Date: _____

REPORT SUMMARY

[The report summary should be brief and cover the most important conclusions from the assessment of the school's computer system.]

PURPOSE OF COMPUTER SYSTEM ASSESSMENT REPORT

[This part of the report should provide an overview of the purpose of the Assessment Report and describe how the report should be used.]

COMPUTER SYSTEM ASSESSMENT PROCEDURE

[This part of the report should briefly describe how the assessment was carried out including the dates when the school's computer system was assessed, the people who were involved in the assessment, what types of information about the school's computer system was collected, and how this information was collected and stored.]

ASSESSMENT FINDING

[This part of the report should list specific findings from the assessment. You are encouraged to use the Computer System Status Assessment template for this. You can insert the completed Computer System Status Assessment template along with this report. The following outlines the type of information you should be collecting when conducting this assessment.]

- Description and the numbers, age and general condition of computers and peripherals (printers, scanners, external drives, etc.) in the school's administration offices
 - Operational state of the computers in the school lab, numbers of computers that are working well and the numbers that are not working
 - For computers that are not working, what are the major problems that these computers have if know (e.g., failed power supply, failed hard drive, etc.)
 - Software found on these computers
 - Operational state of printers and other peripherals
 - Connection to the Internet including the type of connection (phone line, 3G wireless, WiFi Wireless, etc.) bandwidth, reliability, cost, etc. and the use of email and Internet connectivity).

- How are the computers powered, i.e., connection to the electric grid, school generator and solar power system, etc.
- Description and the number, age and general condition of computers and peripherals (printers, scanners, external drives, data show projectors, etc.) in the school's computer lab
 - Operational state of the computers in the school lab, numbers of computers that are working well and the numbers that are not working
 - For computers that are not working, what are the major problems that these computers have if know (e.g., failed power supply, failed hard drive, etc.)
 - Software found on the computers that are working
 - Operational state and numbers of different peripherals
 - Connection to the Internet including the type of connection (phone line, 3G wireless, WiFi Wireless, etc.) bandwidth, reliability, cost, etc. and the use of email and Internet connectivity).
 - How are the computers powered, i.e., connection to the electric grid, school generator and solar power system, etc.

ANY OTHER INFORMATION ABOUT THE SCHOOL'S COMPUTER SYSTEM

6. If your school has a computer lab, how often to do you use it as part of a formal computer class?

NEVER	RARELY	SEVERAL TIMES A MONTH	WEEKLY	ALMOST DAILY	DAILY
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. If your school has a computer lab, how often do you use it as part of other classes?

NEVER	RARELY	SEVERAL TIMES A MONTH	WEEKLY	ALMOST DAILY	DAILY
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. If you use the school's computer lab, how often do you use it as part of non-academic activities during the school day?

NEVER	RARELY	SEVERAL TIMES A MONTH	WEEKLY	ALMOST DAILY	DAILY
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. If you use a school computer, how often do you use it outside of the regular school day (i.e., for extra curricula activities)?

NEVER	RARELY	SEVERAL TIMES A MONTH	WEEKLY	ALMOST DAILY	DAILY
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Please write in the average number of hours per week that you spend using school computers for any purpose.

11. If you were given one hour to use a computer at the school and you could do anything you want, what would you like to do most with the computer for that hour?

12. If the computer lab at the school was open on the weekends for use by students, would you travel to the school on Saturday and/or Sunday to use the school computers?

- Yes (Saturday only)
- Yes (Sunday only)
- Yes (both days)
- No (neither day)

6. How often do you use any of the computers at the school to help prepare lessons for your class?

NEVER	RARELY	SEVERAL TIMES A MONTH	WEEKLY	ALMOST DAILY	DAILY
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. If your school has a computer lab, how often do you take your class into the lab to use computers to help teach something related to the subject that you are primarily responsible for teaching?

NEVER	RARELY	SEVERAL TIMES A MONTH	WEEKLY	ALMOST DAILY	DAILY
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. If you answered the above question “never” or “rarely” what are some important reasons for not taking your class to the computer lab very often? (Mark as many answers as are appropriate).

- I do not know how to use computers.
- I do not need to use computers to teach my subject.
- There is no one to help me in the lab in case there are problems with the equipment.
- We do not have access to the internet.
- We do not have enough working computers in the lab to allow my students to use.
- The computer lab is being used all the time for the school's computer classes.
- Other:.....

9. How often do you use computers in the school for non-academic purposes (for example, sending personal email messages, recreation, research, etc.)?

NEVER	RARELY	SEVERAL TIMES A MONTH	WEEKLY	ALMOST DAILY	DAILY
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. How often do you ask your students to complete assignments where they would need to use a computer? Yes No

6. If you use a school computer, how often do you use the following computer hardware at?

	NEVER	RARELY	SEVERAL TIMES A MONTH	WEEKLY	ALMOST DAILY	DAILY
Flash drive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Printer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LCD Projector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Webcam/microphone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CD/DVD-ROM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scanner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: <i>(please list below)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. If you have not used a school computer or have only used it rarely, what are some reasons for not using it? (Check any answer that is appropriate to you)

- I don't think the school allows people who are not part of the school to use its computers.
- I don't know how to use a computer and wouldn't know what to do.
- I have no interest in using a computer.
- I don't have time to use a computer when the school is open.
- I have a computer at home and don't need to use the school's computers.
- I live too far from the school to take advantage of using school computers.

8. Which of the following activities would you be interested in participating in at the school, if they were to offer them for a fee? (Check all that are appropriate to you)

- Use computers to access the internet.
- Use computers for printing.
- Participate in basic computer training.
- Participate in other types of training such as:

Focus Group Discussion Guide

INTRODUCTION

Holding a focus group discussion is a good way to learn about people's interests, perspectives, opinions and knowledge about different topics. For the Toolkit, the Sustainability Planning Team (SPT) may want to hold focus group discussions to learn what different members of the school community want the school's computer system to be like in five years. The SPT can also use a focus group discussion to learn how teachers, students and other community members are currently using the school's computer system and how they would like to use the computer system in the future. Knowing the perspectives, attitudes and desires of different members of the school community toward the school's current and future computer system is essential to developing an effective sustainability plan.

CREATING AND RUNNING A SUCCESSFUL FOCUS GROUP

The following provides some tips and suggestions for creating and running an effective focus group discussion.

SETTING UP THE FOCUS GROUP

- At least two people should be involved in running a focus group discussion. One of these will ask the questions and guide the discussion. The other person, who will sit off to the side, will take notes on the discussion. It is important that the person asking the questions not take notes on the responses. This can be very distracting and will likely inhibit an open and free discussion.
- It can be useful to organize both homogenous (all teachers, students or parents) and heterogeneous (a mix of teachers, students and parents) focus groups. These two types of groups will create a different dynamic among the participants and stimulate different topics to be discussed.
- It is good to have an equal number for male and female participants in each focus group. It may also be important to have groups that are all men or all women if local culture may make it difficult for women to talk openly when men are present.
- The optimum number of participants in a focus group is 4 to 8 and you should have no more than 12 people in any focus group session.
- The focus group meeting should be held in a comfortable and quiet location.
- Information about the purpose of the focus group meetings, the topics that are to be discussed and how the participants will be selected should be distributed to the school community. This will prevent any rumors about what these meetings are about from being spread.
- Each focus group meeting should not last longer than one or two hours.

PREPARING FOR THE FOCUS GROUP

- The SPT and the people identified to organize and run the focus group discussions should clearly define the primary objective of the discussion and come up with simple questions that can be used to stimulate a discussion among the members of the school community invited to participate in the focus group discussion.
- Four to eight primary questions and/or discussion topics should be developed for each focus group discussion. You should avoid asking questions that can be answered with a yes or no answer.
- If possible, the school should arrange for someone who is not a staff member at the school to facilitate the focus group discussion.
- Make sure to have light refreshments available for participants after the focus group meeting.
- You may also want to have name tags for each participant so that the facilitator can address people directly by name.

CONDUCTING THE FOCUS GROUP

- At the start of the session, the facilitator should greet all of the participants and make sure that they are comfortably situated. The facilitator will then want to review the objectives of the focus group and stress the confidentiality of participants' comments before starting.
- The focus group facilitator should seek to engage the members of the focus group in an open and dynamic discussion and debate about the focus group questions. The facilitator should avoid a simple question and answer session. Some of the most important information will emerge when the participants start discussing the question or topic among themselves. One way to do this is for the facilitator to ask one participant what he or she thinks about what one of the other participants has said. Another technique is to ask the group if anyone disagrees with what was just said, or to ask if anyone has different opinion to share. After being prompted in this way, participants will likely start to engage in an open discussion. The facilitator should encourage participants to provide detailed responses and not just "yes" or "no" answers.
- During the discussion, the person asking the questions should ask follow-on questions to encourage the participants to provide specific information. It is common for participants to initially respond to a question with very general and broad comments. The questioner will need to ask follow-on questions that will gently push the participants to provide specific responses.

- The facilitator should also ensure that all members of the group participate in the discussion by asking each member to respond to different aspects of the discussion. This is necessary because some participants may feel intimidated or shy about expressing their opinions in the presence of others (i.e., a student in front of a teacher, a teacher in front of a principal, etc.).
- It is common for participants to take the discussion in a direction that is different from what the focus group was organized for. When this happens, the facilitator should remind the participants why they are here and then follow-up with a new question to return the discussion back to the focus on the topic.

After the focus group discussion is over, the facilitator should thank the participants for taking the time to participate. The facilitator should also explain that the results of the focus group discussion will be written up and shared with the SPT as an important part of the school's sustainability plan.

The person who took notes during the discussion should immediately write up a full report of the discussion. When writing up the report, make sure that participants' names are not linked to comments made during the session. This will ensure that their opinions are treated confidentially. The first draft of this focus group report should then be shared with the facilitator who will add to the report. A final version of the report should include the names of the focus group participants so that the SPT can ask them for clarifying information if needed.

Student Support Technician Club Background

GOAL

There are several important reasons for establishing a Student Support Technician Club (SSTC) including:

- To enable the school to carry out periodic and basic computer maintenance including cleaning the computers, installing anti-virus updates, defragmenting hard drives, etc.
- To diagnose computer failure to determine what might be the cause of any problems so that decisions can be made to carry out repairs in the school or to send the computer to special repair facilities.
- To help non-computer teachers to use the school's computer lab.
- To provide students who are members of the SSTC with 21st Century employability skills and additional computer knowledge and skills that may help them secure quality employment after they graduate.
- To lower the total cost of maintaining and support the school's computer system.

ESTABLISHING AN SSTC

- At least two teachers should be recruited by the school Director to oversee and manage the SSTC. One of these sponsoring teachers may be the school's computer teacher.
- The SSTC sponsoring teachers should prepare a description of the SSTC (using the sample announcement on the following page in the Toolkit's Annex) that can be distributed to other teachers and students in the school as a means of recruiting students from the older grades to join the club.
- The number of students in the SSTC depends on the size of the school and the number of computers in the school. At least 10 students, half girls, should be recruited to help establish the SSTC. In the second year of the Club, another group of students will be recruited to join the club. At this time, the first group of students would become Senior Technicians and the new students would be Junior Technicians.
- It is recommended that the two sponsoring teachers create criteria to accept students into the SSTC. Pre-existing computer knowledge is not as important as an eagerness to work in a team and to learn about computers.

- Once the first group of students has been recruited, the sponsoring teachers will need to organize an orientation/training session to enable the students to learn to carry out basic computer maintenance activities.
- The teachers and the team of students will then need to develop a set of rules and policies to govern the functioning of the Club. As part of this, the students may want to elect a leader and other positions.
- With a team structure in place. The teachers and the Club members will want to establish a calendar for maintenance activities.

SSTC STRUCTURE

Each club initially consists of a team of 10 to 12 students with two teacher sponsors. The first group of students should be in the second or third to the last year of school. Toward the end of the first year of operation, approximately two months before the school closes for vacation, the members of the SSTC should recruit new members from a grade or two below them. These new members will become Junior Technicians and the initial members will become Senior Technicians. This approach helps to ensure long-term sustainability of the SSTC. The Senior Technicians will orient and train the Junior Technicians. When the first group of Senior Technicians graduates from school, the Junior Technicians become Senior Technicians. After which, they should recruit and train a new group of Junior Technicians. This self-sustaining process enables the school to maintain their SSTC with little or no recurrent expenses.

OVERVIEW OF BASIC TECHNICAL SUPPORT SKILLS

Students should receive training in basic computer maintenance and technical support skills. Some of the most important maintenance and technical support topics that SSCT members should know about include:

- Keeping the outside and inside of a computer clean and free of dust and dirt by learning:
 - to open the computer case while ensuring that the youth is free of static electricity;
 - to carefully blow and wipe dust away from all parts inside the computer, especially the power supply, the CPU and the hard disk drive;
 - to remove and replace all computer cards to ensure that they are tightly connected to the motherboard; and
 - to close the computer case and connect the case to the power, the monitor, keyboard and the mouse.

- Installing, configuring and updating software.
- Updating and running anti-virus and anti-spyware software.
- Defragmenting the hard drive.
- Running registry management software.
- Inspecting installed software and uninstalling programs that are not authorized to be installed.
- Cleaning up the computer's on-screen desktop to remove unnecessary shortcuts and files.
- Periodically running the disk cleanup application to delete temporary files, empty the recycling bin and compress old files.
- Reformatting the hard drive and reinstalling and configuring the operating system.
- Carrying out troubleshooting and diagnostic procedures to determine the cause of computer problems and to decide if the problem can be solved by the SSTC or if it needs to be sent out for repair.
- Installing and configuring new and existing hardware and peripherals.
- Cleaning printers and changing the ink and toner.
- Protecting hardware from power surges by unplugging all hardware from outlets in the event of a power outage.
- If the school has a basic local area network, the students will need to manage user accounts, set up new accounts as needed and delete accounts when students graduate and staff leave the school.
- If the school has Internet access, the students will need to help manage the connection to the Internet, manage use, log into the account as needed, etc.

Student Support Technician Club Announcement Template

STUDENT SUPPORT TECHNICIANS CLUB (SSTC)

Sponsored by [First Teacher's Name] & [Second Teacher's Name]

We are pleased to announce that this year we will be starting a Student Support Technicians Club at our school. The main purpose of this club is to help our school keep its computers operating well and to assist the teachers and students in using these computers. The members of the SSTC will gain advanced computer skills, learn to maintain this equipment, and diagnose problems. As the members' skills improve, some may even start learning to repair basic problems and replace parts that have stopped working. In short, the members of the SSTC will become the most advanced computers users at our school.

WHO CAN APPLY TO BE A MEMBER OF THE SSCT?

This exclusive club is not open to anyone; only qualified students from grades 9, 10 and 11 [or the appropriate grades] can apply to join the SSTC. If you would like to learn more and are interested in applying to be selected for the club, please contact [Name of first sponsor] or [Name of second sponsor] to collect an application form. The following is a list of criteria to be eligible to join the club:

- Applicants must be very interested in computers and in learning how to maintain and repair computers.
- Applicants must have a very good academic record at the school.
- Applicants must be curious to learn how computers work and how to keep them working well.
- Applicants must have the time to dedicate to club activities for an hour before school starts, during lunch and for an hour after school ends.
- Applicants must be dependable, curious and honest.
- Applicants must be interesting in taking on important leadership roles at our school.
- Applicants must enjoy helping others learn to use computers.
- Applicants must be willing to make a year-long commitment to being a member of the SSTC.
- Applicants must get permission from their parents to join the club.
- Applicants must complete the club application form and submit it to [Name of first sponsor] or [Name of second sponsor] by [enter due date].

IS THE CLUB IS OPEN TO GIRLS AND BOYS?

We strongly encouraged boy and girls to apply to join the SSTC. At least half of the initial 12 students who are selected to join the club will be girls.

WHY SHOULD YOU APPLY TO BECOME A MEMBER OF THE SSTC?

One of the most important reasons to join the SSTC is because you will have a great deal of fun. You and the other members will also be given the opportunity to use the school's computers more than anyone else. You will learn how a computer works and how to keep it working well. You will also gain advanced computer skills and earn leadership responsibilities at the school. Through the many exciting club activities, you will gain a useful mix of employability skills as you provide service to others at the school in a way that is similar to how many companies carry out their business. These skills will make SSTC members more competitive in securing jobs in the future.

WHAT KINDS OF COMPUTER SKILLS WILL I LEARN AS AN SSTC MEMBER?

SSTC members will gain many exciting new computer skills. Some of the most important maintenance and technical support skills that SSCT members will gain over the coming year include:

- Maintaining computers ✧ Installing software ✧ Destroying viruses
- Installing hardware ✧ Troubleshooting

Fundraising Idea Submission Form

RULES FOR SUBMITTING IDEAS FOR SCHOOL FUNDRAISING COMPETITION

- All members of a team must be in the same grade level or range (i.e., all in grade 7 or all in grades 7-9).
- Teams should have between 2-6 students each.
- Only one idea is allowed to be submitted per team, but teams should consider many ideas to arrive at the one that they want to submit.
- Students may not be on more than one team.
- Students are allowed, and encouraged, to talk with their parents and local business people to help them generate ideas and to gather opinions about ideas that they have come up with.

PRIZES

- One team or individuals from each grade will receive the top prize of [The school will need to decide what the first prize should be. This should be something that the students find valuable.].
- Second and third prizes of xxx and xxx will be given to the teams that submit the second and third best ideas respectively.
- The prizes should be shared equally by members of the team.

TIPS FOR GOOD FUNDRAISING IDEAS

- A good idea should not require much money to carry out.
- A good idea should have a high net revenue potential.
(total money earned – costs = net revenue)
- A good idea should engage a broad mix of people from the school and the surrounding community.
- A good idea can be carried out by the staff, students and parents with little or no special skills required.
- A good idea should demonstrate a high level of market demand.
- A good idea should be able to be implemented on a recurrent basis so that revenue is predictable and recurrent.

- A good idea might use the schools computer system.
- A good idea should be fun for everyone involved.
- A good idea should be easy to market and promote.
- A good idea should contribute to the school's educational objectives.
- A good idea should not be too complex or time consuming to complete.

TEAM INFORMATION

Names of team members:

.....

.....

.....

.....

Grade Level or Rage:

TITLE OF YOUR FUNDRAISING IDEA

.....

SUMMARY DESCRIPTION OF YOUR TEAM'S FUNDRAISING IDEA

.....

.....

.....

What funds, equipment, people and other resources would be needed to implement your idea?

.....

.....

.....

How much money would be needed to plan and implement your idea?

.....

What equipment and/or materials would be needed to plan and implement your idea?

.....

.....

.....

How many people and what skills would be needed to plan and implement your idea?

.....

.....

.....

What other resources and school/community facilities would be needed to implement your idea?

.....

.....

.....

How much time would be needed to implement your idea?

.....

.....

.....

Who in the community (staff, students, parents, other community members) would participate in your idea?

.....

.....

.....

How long will this activity last for?

.....

If successful, could your idea be repeated?.....

How often?

How much total money do you think your idea would generate?.....
(show your calculations)

How much net revenue do you think your idea would generate?.....
(show your calculations)

What level of market demand is there for your idea?
.....
.....
.....

How did you determine market demand for your idea?
.....
.....
.....

About CISCO Networking Academy

<http://www.cisco.com/web/learning/netacad/academy/index.html>

Comprehensive Learning Program

Cisco Networking Academy is a global education program that teaches students how to design, build, troubleshoot, and secure computer networks for increased access to career and economic opportunities in communities around the world. Networking Academy provides online courses, interactive tools, and hands-on learning activities to help individuals prepare for ICT and networking careers in virtually every type of industry.

Program Evolution

Since 1997, Networking Academy has grown from a small-scale program designed to help schools get the most out of their networking equipment to Cisco's largest corporate social responsibility program, with courses taught at more than 9000 academies in 165 countries. More than 900,000 students develop ICT skills through the program each year.

21st Century Career Skills

Networking Academy delivers a comprehensive, 21st century learning experience to help students develop the foundational ICT skills needed to design, build, and manage networks, along with career skills such as problem solving, collaboration, and critical thinking. Students complete hands-on learning activities and network simulations to develop practical skills that will help them fill a growing need for networking professionals around the world.

Global Partnerships

Networking Academy aims to provide a consistently enriching learning experience by partnering with public and private institutions such as schools, universities, businesses, nonprofits, and government organizations to develop and deliver innovative ICT courses, improve the effectiveness and accessibility of the program, increase access to education and career opportunities, and help ensure that students and instructors have the resources they need to accomplish their goals.

Delivery Method

Networking Academy courses are delivered in multiple languages through an online learning system. Courses are supported by classroom instruction, hands-on learning activities, and online assessments that provide personalized feedback. Networking Academy instructors receive extensive training and support to help ensure a consistently-enriching learning experience for students around the world.

MORE THAN 900,000 STUDENTS WORLDWIDE



Networking Academy partners with government agencies, businesses, nonprofits, and international NGOs to support students and alumni in their educational, entrepreneurial, and occupational endeavors.

Corporate Social Responsibility

As Cisco's largest corporate social responsibility program, Networking Academy aims to improve socioeconomic conditions in communities around the world by increasing access to education and career opportunities, supporting the development of an educated ICT workforce, and promoting the growth of the ICT industry.

In support of the United Nations Millennium Development Goals, Cisco Networking Academy aims to help bridge the digital divide by extending learning opportunities to students in developing countries and those with disabilities. Networking Academy also empowers women by supporting their professional development and encouraging gender equality within the ICT industry.