

# Computer System Sustainability Toolkit

A Practical Guide for Schools  
Second Edition

DR. ERIC RUSTEN, AED Information Technology Applications Center



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# Computer System Sustainability Toolkit

A Practical Guide for Schools  
Second Edition

**DR. ERIC RUSTEN**

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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- What are the primary goals of the SPT?
- How should the SPT be organized and operate?



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# Acronyms

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



# Acknowledgements and Background

The first edition of the *Computer System<sup>1</sup> Sustainability Toolkit* was developed as part of a pilot project funded by the Qualcomm Wireless Reach™ initiative with six schools in Indonesia<sup>2</sup> 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.

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- 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](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.<sup>3</sup> 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.

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<sup>3</sup> 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.<sup>4</sup> 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

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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 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.





