

**THE APPROPRIATENESS OF INFORMATION TECHNOLOGY
DEVELOPMENT IN SUB-SAHARAN AFRICA**

by

JOHAN LODE KAREL ROBERT MARIA RUBENS

submitted in part fulfilment of the requirements for
the degree of

MASTER OF ARTS

in the subject

DEVELOPMENT STUDIES

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: DR. IMM DU PLESSIS

NOVEMBER 2002

ACKNOWLEDGEMENTS

My sincere gratitude and appreciation for the completion of this dissertation goes to the following:

- Dr. IMM du Plessis, my supervisor, for his guidance, support, encouragement, and knowledge of development issues.
- Laura, my wife for her understanding and support, and Charlotte my new-born daughter for bringing joy to our lives.
- Editor Jessica Bryan of Lompico Creek Press for her perfectionism.
- Leanne Brown for being of great help when I was in South Africa.
- The people of a non-disclosed school in Jinja, Uganda.
- The staff at Schools Online for their input, time, and objectivity.
- David Korten for being a voice of reason among development practitioners and inspiring me through his writings.

Table of contents

CHAPTER 1	1
THEME ANALYSIS AND STATEMENT OF THE PROBLEM	1
1.1 INTRODUCTORY ORIENTATION	1
1.2 THEME ANALYSIS	4
1.2.1 Silicon Valley-Based Organisation	4
1.2.2 Information Technology Development	6
1.2.3 Sub-Saharan Africa	7
1.3 STATEMENT OF THE PROBLEM	8
1.4 CENTRAL THEORETICAL STATEMENT	8
1.5 RESEARCH PROCEDURES AND METHODS	9
1.6 THE MOTIVATION FOR THE PRESENT RESEARCH PROJECT	11
1.7 PROGRAM OF THE STUDY	13
CHAPTER 2	15
THE HISTORY, PROGRAMMES, STRUCTURE, AND VISION OF A SILICON VALLEY-BASED ORGANISATION	15
2.1 INTRODUCTION	15
2.2 THE HISTORY OF SCHOOLS ONLINE AND THE CONTEXT IT STARTED IN	17
2.3 THE MAIN SCHOOLS ONLINE PROGRAMMES	19
2.3.1 The Alliance for Global Learning	19
2.3.2 Global Education Model Schools	20
2.3.3 Technology Component in AGL and GEMS	21
2.4 THE ORGANISATIONAL STRUCTURE OF SCHOOLS ONLINE	21
2.4.1 Structure	21
2.4.2 Staff	23
2.5 VISION	30
2.6 CONCLUSION	33
CHAPTER 3	35
INFORMATION TECHNOLOGY DEVELOPMENT IN SUB-SAHARAN AFRICA	35
3.1 INTRODUCTION	35
3.2 DEVELOPMENT	36
3.3 HOW SCHOOLS ONLINE UNDERSTANDS DEVELOPMENT	37
3.4 WHAT IS INFORMATION TECHNOLOGY FOR SCHOOLS ONLINE	39

3.5 THE REALITY OF INFORMATION TECHNOLOGY DEVELOPMENT IN SUB-SAHARAN AFRICA	40
3.5.1 Introduction	40
3.5.2 Lack of Infrastructure	41
3.5.3 A Different Cultural, Social, and Political Reality	44
3.6 CONCLUSION	49
CHAPTER 4	50
A FOCUS ON A SCHOOL-BASED INFORMATION TECHNOLOGY PROJECT IN A UGANDAN SCHOOL	50
4.1 INTRODUCTION	50
4.2 SHORT INTRODUCTORY BACKGROUND ON UGANDA	51
4.3 A SCHOOL-BASED INFORMATION TECHNOLOGY PROJECT IN UGANDA	52
4.3.1 Uganda Project	52
4.3.2 School in Jinja	58
4.3.2.1 Introduction	58
4.3.2.2 Enthusiasm and Concern	59
4.4 CONCLUSION	66
CHAPTER 5	68
RECAPITULATION OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS	68
5.1 RECAPITULATION OF FINDINGS	68
5.1.1 Chapter 1	68
5.1.2 Chapter 2	69
5.1.3 Chapter 3	70
5.1.4 Chapter 4	71
5.2 CONCLUSIONS	72
5.3 RECOMMENDATIONS	73
5.3.1 Recommendation 1	73
5.3.2 Recommendation 2	75
5.3.3 Recommendation 3	76
5.4 PROPOSED FIELDS OF STUDY	77
5.5 SYNTHESIS	77
Appendix 1	
Bibliography	
Online sources	

SUMMARY**THE APPROPRIATENESS OF INFORMATION TECHNOLOGY DEVELOPMENT IN SUB-SAHARAN AFRICA**

JOHAN RUBENS

MASTER IN DEVELOPMENT ADMINISTRATION

SUPERVISOR

DR. IMM DU PLESSIS

Many development organisations are initiating programs in Sub-Saharan Africa bringing information technology to community centres, schools, universities, and government institutions. In the United States and more particularly Silicon Valley, California, people are convinced of the benefits of the Internet. An organisation started in this context, Schools Online, has initiated programs in over 31 countries and spent millions of dollars in the South. The study focuses on Schools Online's history, structure, and vision while researching its activities in a rural school in the town of Jinja, Uganda, in Sub-Saharan Africa. It is recommended that Schools Online listens and learns from its beneficiaries when planning an information technology project.

Key terms:

Information technology development; Sub-Saharan Africa; Digital Divide; African cyberspace; Internet; Computer; Silicon Valley development organisation; Appropriate development; Uganda; School Internet Learning Centre

CHAPTER 1

THEME ANALYSIS AND STATEMENT OF THE PROBLEM

1.1 INTRODUCTORY ORIENTATION

The Internet is changing human culture. In the fourth millennium BC, sophisticated cultures developed along great rivers¹. Today, a new and complex culture is growing along the Internet's information superhighway. Shadows loom large of course. Despite its name, this river is not reaching the majority of the world's population. People denied the profits of the global economy are the ones missing the benefits of this virtual river. While the developing world is struggling to keep up with the fast spread of information, Northern nations have accepted the Internet with open arms. Northern governments are convinced new innovative technologies related to the Internet, such as the availability of high-speed access, as well as the World Wide Web, are prerequisites for development. This situation is quite similar to the 1950s, when America warned the South that in order to keep up, or even to overcome the existing development gap, the South would have to invest in modernity. This time, America is suggesting "modernity" to be computers and the Internet. Therefore, more and more development organisations in the United States are focusing efforts on spreading information technology.

It seems fair to state people of the world are divided into the information-rich and information-poor, i.e., "master minds" and those who are "still in the dark". However, are computers the solution and are they needed in the majority of the world's countries where other pressing needs may be considered higher priorities? Korten (1998:33) writes: "The most pressing unmet needs of the world's people are

¹ The Nile, the Tigris-Euphrates, the Ganges

food security, adequate shelter, clothing, health care, and education - the lack of which define true deprivation." One needs to consider the thoughts expressed by Spencer (1998:267). The Australian author of many books on cyberspace and feminism writes: "In countries where children are dying of starvation, where there is little or no health care and no clean water, it borders on the obscene to talk about the pressing need for information infrastructure". On the other hand, most would agree that empowerment is needed in order for people to gain control over the forces that shape their lives. In order to attain empowerment, one needs to be informed. Keeping the masses ignorant is a way of oppression. Obstructing access to information may be seen as stifling people and as an immediate attack on basic human rights and consequently may contribute to underdevelopment. The idea of providing computers and the Internet to the South is being considered by the most powerful international agencies to be the best immediate response to the needs of many of the world's poor. It is claimed this will in turn contribute to their development. Still, serious mistakes have been made in the past when trying to modernise the South and thus an important debate has been initiated between proponents and adversaries of the spread of information technology in developing countries as well as between the supporters of divergent techniques of introducing this technology.

Godlee, Horton and Smith (2000:1129) mention in an article in *The Lancet*: "The recent millennium assembly of the UN emphasised this point in their statement on the right of access to information and communication. Information underpins the learning, research, and debate that drive a country forward. Access to information is essential for describing and understanding the deficiencies of the present, building visions of a better future, developing practical ways to achieve those visions, and educating and inspiring those who must make the future. Information empowers, and those who work with information-flow in the rich world should find ways to enhance the flow, recognising that the flow, like good communication, must

be two-way." Many development organisations today use this argument, claiming the poor of this world are being kept in the dark, while the North is experiencing an unprecedented free flow of information. They believe the North needs to step up to the challenge and provide the necessary tools to the South, allowing them to access information of a similar quality and quantity.

According to Elahian (2002): If a development agency were to bring computers and Internet connectivity to a school in rural Africa, its students would be able to voice opinions and access virtual libraries as well as be in touch with overseas students. Farmers in that village could be informed about the latest techniques in agriculture, women could find ways of empowerment and artists could attempt to sell art on the Internet without having to lose profit to a "middle man". Freedom of speech, gender equality, access to information and the right to fair economical freedom would be among the human rights protected by such a project. Similar projects would potentially change the future of the beneficiary communities on an ongoing basis. Korten (1995:297) writes: "Their use of the same electronic communications technologies - telephone, fax, and computer - that corporations have used to extend their global reach allows them to move quickly and flexibly in joint actions at local, national, and global levels."

Can we expect the above theory to become reality? In order for the spread of information technology to be done appropriately in the schools of developing nations, many factors will need to be assessed. What are those factors? Are these factors being considered by the development organisations spreading information technology in schools in developing countries and, what are the immediate experiences of the schools that receive information technology?

In this dissertation, the researcher will study these questions and by way of a case study try to clarify how appropriate it is for a Silicon Valley-based development organisation to distribute information technology to schools in developing countries.

1.2 THEME ANALYSIS

In this dissertation *THE APPROPRIATENESS OF INFORMATION TECHNOLOGY DEVELOPMENT IN SUB-SAHARAN AFRICA* will be researched. The study will elaborate on the specific experiences of a Silicon Valley-based organisation and the case of a school in Uganda accepting information technology from the latter organisation. It is therefore essential that the following concepts be defined and described in more detail:

1.2.1 Silicon Valley-Based Organisation

Silicon Valley is an area in Northern California where, in the mid- to late-1970s, a number of inventive industrial engineers set the stage for the computerisation of the developed world. Many of the companies started by these very people gained strong economic momentum and were the drive behind the eventual spread of the personal computer and subsequently the Internet giving way to a true economic boom peaking in the mid-1990s and heavily impacting the culture of the area.

The importance of this concept will become clear during the research, as the relevance of the locality of a development organisation in relation to its beneficiaries will be discussed. Can an outside organisation determine local needs appropriately? Does an organisation formed by and with Silicon Valley individuals understand the complexity of very different cultural environments?

The structure of an organisation as well as its vision is impacted by its locality. It is therefore crucial that the researcher focuses on the organisation itself. When and by whom was the organisation initiated and who was hired in what capacity?

The organisational expert and management theorist Morgan sees *organisations* as organisms. According to Morgan (1998:45), an organisation is divided into molecules, cells, systems, organisms, species, and ecological systems. An organisation, as Morgan perceives it, is a living organism capable of adapting to a changing environment, eventually evolving into a mature and more flexible organisation. This metaphor suggests that congruence with the environment is the key to success. An organisation that devotes a proportionate amount of time and energy to understanding the immediate environment in which its customers, competitors, and suppliers operate ensures development of appropriate operational and strategic responses within its structure.

Looking at an organisation from the organic perspective, it is important to keep in mind the following aspects:

- There is no one best way of organising. The appropriate form depends on the kind of environment in which the organisation is operating; therefore, environmental scan and adaptation are crucial.
- Different management approaches may be necessary to perform different tasks within the same organisation; therefore, the most efficient and ready-to-duplicate style may not be useful.
- Needs of each subsystem must be identified and fulfilled in order to retain qualified personnel.

The Silicon Valley-based organisation subject to this dissertation is Schools Online, an organisation described by its founder Elahian (2002) as a Silicon Valley-based

non-profit organisation working to steer the information technology development of schools in the South.

1.2.2 Information Technology Development

Information technology will represent computers and the Internet in the light of this dissertation. More specifically, information technology will be understood as a small, networked computer laboratory consisting of two to ten computers, plus printer and scanner as well as an Internet connection². In this study, the researcher will place the information technology in the local context and elaborate in depth on the obstacles of deploying computers and the Internet in Sub-Saharan Africa.

Even though radio, telephone, and television could be considered information technology, they will not be discussed in this dissertation.

Development: The word "development" has been used in many contexts. As a result it has become a buzzword often abused by international institutions trying to gain credibility for specific activities in the South. Even though modernisation theory and the defining of development according to Western standards seems long past, there is still much disagreement about the true meaning of the word. Many theorists expand on various definitions of the term. Kotze (1983:13) distinguishes three definitions of development:

- Empirical: Refers to actual results of development. Examples: Economic growth, improvement in educational and health services, better nutrition, and other social indicators.

² See Appendix 1 for more detail

- Operational: Describes what should be done to achieve a condition of full development. An operational definition of development has a future vision and projects into the future. Examples: Visualising a new and improved communication system, structures for maintaining peace, new household aides, and medical services.
- Moral: A moral definition of development will intrinsically be idealistic and will prescribe an ideal society as it measures up to a particular value system.

Crucial with regards to this study is understanding that “development” includes more than just economic progress. “Development” also entails social, political, and most importantly in terms of this dissertation, technological advancement. This may or may not eventually lead to economic progress, however this will not be the focus of this dissertation. The focus will be on infrastructure, human capacity, and the cultural context in place as well as on demands posed by installation of high-end equipment in rural schools and how this contributes to or obstructs the development of a community.

1.2.3 Sub-Saharan Africa

The study is concerned with Sub-Saharan Africa and focuses on a town³ in Uganda.

Sub-Saharan Africa is considered Africa below the Sahara. It is formed by the countries of Western, Eastern, and Southern Africa. Morocco, Algeria, Libya, and Egypt on the other hand are considered Northern Africa and will not be within the scope of this dissertation.

³ Jinja

This study focuses on a rural school in the town of Jinja, in the Eastern Province of Uganda in particular. In light of this dissertation, a school implies a "high school" or "secondary school". In other words, students relevant to this study passed an elementary or primary education and range from eleven to twenty years of age.

1.3 STATEMENT OF THE PROBLEM

The above introduction and theme analysis lead the researcher to the following "research question" (Mouton 1996:93):

Is information technology development in Sub-Saharan Africa appropriate?

The unit of analysis will be an organisation and schools in the South with a focus respectively on employees, students, teachers, and a principal.

With regards to variables, the dissertation aims to investigate the location and consequent culture of an organisation and the way these factors relate to the project on the ground in a school of a developing country.

1.4 CENTRAL THEORETICAL STATEMENT

The researcher will attempt to verify the following statement:

Information technology development in Sub-Saharan Africa is appropriate.

1.5 RESEARCH PROCEDURES AND METHODS

Although this dissertation will primarily focus on the case study of a Silicon Valley-based organisation, the researcher will link this to the specific experiences of a school in Uganda. The methodology will include two major approaches: Practical and theoretical. Field study will bring practical evidence and help explain the benefits as well as the negative consequences of an outside organisation introducing information technology locally. Face-to-face interviews and participatory research will provide practical insight and will allow for relevant data collection with and for participants. Theoretical research refers to the need to understand the concept of introducing new technologies in developing countries. It is crucial to mention that the topic of distributing information technology into the developing world is fairly new. Not much theory has been written about the successes or failures. Each approach will demand different methodological steps.

Theoretical approach:

- Review of literature and articles
- Systematisation of ideas

This will create an understanding of the views on the introduction of appropriate technology in the development process. By reading pertinent literature, a clarification of the impact of information technology projects on the social and cultural environment will follow.

Field study

- Design of field study
- Selection of participants
- Design of qualitative interviews

- Case study
- Qualitative analysis of collected information
- Theorising

Since the aim of this research is to explore the appropriateness of an outside organisation bringing resources to Sub-Saharan Africa⁴, it seems necessary to involve the organisation and the school as much as possible in the search for answers. Therefore a participatory approach seems desirable. As Kathleen Collins (1999:2) describes "Participatory research is the collective generation of knowledge which leads to the planning and achievement of jointly set objectives." In the past, many organisations bringing in outside resources were assumed to be taking the right action before local people were consulted and before local needs were thoroughly assessed. It is therefore of great importance that local people are involved in this research. Without the words of the beneficiaries of the programmes that will be evaluated this thesis would be hollow. Mulenga (1994:11) writes: "Participatory research [...] refers to an emancipatory approach to knowledge production and utilisation. Its aim is to actively involve the oppressed and disenfranchised people in the collective investigation of reality in order to transform their reality."

Minor quantitative questions will be of help, but the main contribution to this dissertation is derived from qualitative, informal interviews with participants. Data for this project was collected mostly from observations as well as from interviews conducted in person via telephone and e-mail. Having worked at Schools Online for the past two years, the researcher had a chance to directly observe programme meetings and staff meetings and to participate in off-site events as well as to make field visits to schools in the South. The current study enjoyed full access to

⁴ The case of a Ugandan school in particular

programmatic, financial, and business development documents as well as other confidential statements.

These qualitative interactions will allow for a detailed description of the appropriateness of information technology development in Sub-Saharan Africa.

1.6 THE MOTIVATION FOR THE PRESENT RESEARCH PROJECT

From a Northern perspective, it seems rational to be excited about opportunities offered to developing countries by the Internet and its associated technologies, and as the researcher mentioned above, the North is quite convinced computers and the Internet will contribute greatly to Africa's development. But it is important to assess how "beneficiaries" perceive the "benefits" of aid in the form of technology.

Is it possible to sustain use, in an unstable environment often lacking infrastructure, long enough to create benefit for the end user? Or as critics put it, is this just another marketing tool meant to open markets for the distribution of tools created in the North, and with regards to this dissertation, in Silicon Valley? Is it appropriate to dump second hand computers in Africa?

A premise for this dissertation is the conviction that locally sustainable projects demand local buy-in to survive. Without local interest, a development project will be out of context and may seem very necessary to a donor organisation, but lack any long-term relevance to the population it is supposed to be serving. Herein lies the motivation for this research. The research is aimed at finding out if a Silicon Valley-based organisation can appropriately bring information technology development to Sub-Saharan Africa.

The specific organisation is "*Schools Online*", a Silicon Valley-based⁵ non-profit organisation, which has as its vision statement: "Connecting the world...one school at a time". Schools Online is working in thirty-one countries around the world⁶.

Schools Online is a young organisation of about seven employees and prizes itself as being very concerned with the consequences of its activities. Based in downtown San Jose, the heart of Silicon Valley, most of its funds are generated from the local computer industry. An American-based non-profit organisation working in countries all over the world where different cultures and various social structures prevail has the capacity to do a lot of harm if its practitioners are not well educated in development theories and if activities are not well considered. The researcher was part of the original international programme team and is thus in a privileged position to find out what various organisations are planning with regards to the information technology spread throughout the developing world and how this is affecting the latter. Schools Online is partnering with other international organisations⁷ and local non-governmental organisations⁸ and is supporting continent-wide movements instigated by local initiatives⁹.

All these factors contribute to the fact that a good research project might truly assist the participants and beneficiaries involved. Research could shed light on why development institutions are so eager to jump on this bandwagon, as well as provide needed information for future initiatives with regards to distribution of information technology into the developing world.

⁵ United States

⁶ Schools Online Country List. 2002. Available: <http://www.schoolsonline.org/whatwedo/countries.htm> (accessed on 17 January 2002)

⁷ World Links for Development; The International Education and Research Network

⁸ Global Education Partnership Kenya; SchoolNet South Africa; Club Jeunes Dakar; etc.

⁹ SchoolNet Africa

Do United States-based organisations take into account crucial differences in infrastructure when suggesting or even donating technology? Can a group of individuals based in a United States office comprehend the complexity of absorbing donated computers into a rural school in a developing country? Do United States-based development organisations take time to initially develop a team of experts with knowledge and understanding of the local culture? How do organisations in the United States envision they can appropriately respond to this need?

And in turn, does the Internet provide useful information for students and teachers in developing countries? Does it allow them to express opinions? The Internet could amplify voices never before heard. But development work requires caution. As the spread of computers and the expansion of the Internet are becoming part of the policy of many development institutions, the researcher sees the need to assess this practice and to research the value of the concept. Are the World Bank¹⁰, the United Nations¹¹, the Canadians¹², SchoolNet Africa, and Schools Online using caution when promoting this development theory and when bringing it into practice? This dissertation aims to focus on one of the above-mentioned organisations: Schools Online.

1.7 PROGRAM OF THE STUDY

The further program of research follows the above introductory orientation, theme analysis, explanations of relevant concepts, and statement of the problems.

¹⁰ Through World Links for Development

¹¹ Through UNITES

¹² Through the International Development and Research Centre

Chapter 2 will focus on the Silicon Valley-based organisation. Its history, programmes, structure, and vision will be researched. The context and background of the organisation's inception and programmes will be clarified.

Chapter 3 deals with development. It explains what development means for a Silicon Valley-based development organisation and what information technology is within the scope of this study. This chapter will also explain the Sub-Saharan realities with regards to information technology.

Chapter 4 discusses the case of Uganda and focuses on a particular school's experiences after receiving information technology donations from a Silicon Valley-based organisation.

Chapter 5 recapitulates the findings in each chapter and draws conclusions before making recommendations. Chapter 5 will also discuss the relevant proposed fields of study.

CHAPTER 2

THE HISTORY, PROGRAMMES, STRUCTURE, AND VISION OF A SILICON VALLEY-BASED ORGANISATION

2.1 INTRODUCTION

In the context of the overall theme, *The appropriateness of information technology development in Sub-Saharan Africa*, the experiences of a specific Silicon Valley-based organisation distributing information technology to developing countries will be researched. In this chapter, the focus is on the history, structure, vision, and programmes of Schools Online, a Silicon Valley-based organisation.

The Silicon Valley-based organisation the researcher will discuss is called Schools Online. Schools Online is a young non-profit organisation located in San Jose, California. The organisation grew out of the economic boom affecting the computer industry during the 1990s.

Corporate people, who were mistrusting of the existing development organisations, were looking for new and better ways to influence and affect development. A new trend of charity called "corporate philanthropy" accompanied the economical headway made possible by the new entrepreneurial spirit that initiated young but fast growing Internet businesses. Corporate philanthropy aimed at improving the efficiency of development organisations of the past. Schools Online was created in this context.

Schools Online's mission is to help students gain access to and use the communication and information resources of the Internet for learning and cross-cultural dialogue. The organisation has been implementing its programmes in

thirty-one countries, including the United States. Schools Online states that it achieves its mission by providing schools with the various components needed to steer information technology development successfully. These components are named on the Schools Online web site¹³:

- Providing appropriate technology and Internet access.
- Facilitating the professional development of teachers.
- Cultivating online educational and cross-cultural projects.
- Developing locally driven and sustainable Internet learning centres.
- Sharing our knowledge and experience.

When the organisation initiated international programmes, its role was limited to providing solely a technology component. The provision of the remaining components was addressed by forming partnerships with other organisations. As Schools Online evolved over the years, it became more and more assertive with regards to the various components it deemed necessary to complete an information technology project in schools in developing countries.

It will become increasingly clear in this chapter how history and location, as well as the structure of an organisation, relate to the culture and vision it adheres to and consequently drives the type of programmes the organisation initiates.

¹³ Schools Online Mission. 2002. Available: <http://www.schoolsonline.org/whoweare/mission.html> (accessed on 17 January 2002)

2.2 THE HISTORY OF SCHOOLS ONLINE AND THE CONTEXT IT STARTED IN

Schools Online came into existence during October 1996, the year that marked a turning point in connecting most United States schools to the Internet. At the beginning of 1995, President Clinton announced the "Technology Literacy Challenge" urging the nation's parents, teachers, government, communities, and business leaders to work together to ensure that all of the children in America were technologically literate by the start of the 21st century. To reach that goal, Clinton established the four pillars of a technology agenda¹⁴:

- Connect every school and classroom in America to the information superhighway.
- Provide access to modern computers for all teachers and students.
- Develop effective and engaging software and on-line learning resources as an integral part of the school curriculum.
- Provide all teachers with the training and support they need to help students learn through computers and the information superhighway.

President Clinton's call was timely, because it coincided with the technology boom that took place in Silicon Valley, California. Local governments, individuals and most importantly, private sector businesses willing to volunteer time and resources to provide technology to schools, enthusiastically answered his vision. As a matter of example and to highlight the enthusiasm accompanying the President's vision, one may recall March 9, 1996, the day on which a series of events called "NetDays" were initiated in the United States. NetDays were low cost and volunteer-based initiatives aiming to wire as many schools as possible in an entire state on a

¹⁴ The Presidents Plan for Education. 1998. Available:
<http://www.ed.gov/updates/PresEDPlan/part11.html> (accessed on 4 April 1998)

particular day. Following the first NetDay in California, many high-tech companies started a corporate philanthropy programme, donating thousands of dollars worth of computers and other equipment. By the end of 1996, most major high-tech companies including Apple, Microsoft, Sun Microsystems, Siemens, Cisco Systems, and Nortel announced special grants, awards, and scholarships that would accelerate the process of wiring schools nation-wide to the Internet.

Coming into existence in the midst of a newly emerged technology-focused corporate philanthropy¹⁵, Schools Online has adopted a similar approach. The scope of intervention was originally local – mainly Milpitas and San Jose schools, and eventually national – aimed at, but not limited to, underprivileged schools located on Indian reservations in the Appalachian Region. The priority was to get as many schools connected to the Internet as possible. The goal was five thousand schools by the year 2000. By 1998, however, the majority of United States schools had been connected to the information superhighway through NetDays, the enthusiastic commitment of private businesses and non-profit organisations, as well as the United States government Telecommunications Act of 1996 mandating that all schools and libraries receive discounts for telecommunication services.

Keeping in mind the context described above affecting the launch of Schools Online, it is important to also specify the individual behind the major bulk of initial funding.

Elahian, founder of Schools Online is an Iranian-born entrepreneur who set out to change the world through Internet-related activities. Elahian¹⁶, in October of 1996, was not out to build a new e-business nor was he intent on making another fortune. Instead, he dreamed of hooking up schools across the globe, letting people learn

¹⁵ End of 1996

¹⁶ Founder of successful Internet start-ups CAE Systems and NeoMagic, to name but a few

and communicate with each other through the World Wide Web. The idea was noble and actually took Clinton's vision to a global level. Elahian (2002) told the researcher during an informal interview in January of 2002 that his idea was based on a simple premise. Elahian (2002) specified: "Give technology and tools to teachers and students across the world and let them realise humans are more similar than different; we all share basic human needs and aspirations, no matter how different or confining our cultures are. You will see the world become a better place."

Elahian formed a Board of Directors including high level individuals such as Lip-Bu Tan, founder and chairman of Walden International Investment Group and Arthur F. Schneiderman, Senior Partner at Wilson Sonsini Goodrich & Rosati. Besides donations and sponsorships from high-tech companies such as Hewlett Packard, Centillium Communications, and C-Cube Microsystems, Elahian himself supplied approximately 8.5 million U.S. Dollars of the 13 million U.S. Dollars the organisation had in its coffers in 1999. At the time, Rahimi (2002), the Chief Executive Officer (CEO) of Schools Online mentioned that due to the economic boom in the computer industry, the organisation's funding was expected to double before the end of that year.

2.3 THE MAIN SCHOOLS ONLINE PROGRAMMES

2.3.1 The Alliance for Global Learning

With huge funding available and instigated by an extremely motivated founder, Schools Online began to look outside the United States for assistance in bridging the digital divide between the developed and developing countries. The year 1999 marked the beginning of Schools Online's international journey. Its objective was to

provide students in developing countries with access to resources of communication and information technologies. This goal was to be attained by addressing three needs: A lack of technology, a lack of computer literate educators, and a lack of international dialogue among students.

Since Schools Online's expertise was in technology, provision of equipment became the organisation's key focus. In order to provide the remaining components¹⁷ as well as to gain some experience in international development projects, Schools Online invited two non-profit organisations that had been active in the field for several years to form a partnership.

In March 1999, World Links for Development (WorLD), The International Education and Research Network (iEARN), and Schools Online celebrated the formation of the Alliance for Global Learning (AGL). The alliance aimed at improving the lives of communities around the globe through information technology. In this new partnership, WorLD was responsible for providing professional development for teachers and the iEARN network served as a forum for collaborative projects between schools in developing countries. Since the partner organisations had already established relations with schools, teachers, and communities in several developing countries, Schools Online entrusted them with selection of participating schools.

2.3.2 Global Education Model Schools

Another international joint programme was launched in June 2000, when Schools Online and iEARN created Global Education Model Schools, or GEMS. In this case, management from both organisations performed school selection. iEARN had

¹⁷ Computer literate educators and international dialogue among students

presence in the communities through local chapters and Schools Online had made a number of contacts in the developing world through AGL.

2.3.3 Technology Component in AGL and GEMS

In both programmes¹⁸, each selected school was rewarded with an Internet learning centre (ILC) consisting of ten state-of-the-art computers, a printer, projector, digital camera, and scanner. The ILC model was encouraged consistently in all schools and was thus seen as a blueprint information technology solution appropriate for various schools in very diverse communities around the world. To quote Schools Online CEO Rahimi (2002): "An ILC as developed by Schools Online is a basic model of networked computers that should be transplantable across borders and cultures". An ILC as prescribed by Schools Online consists of ten networked state-of-the-art computers and some periphery¹⁹ totalling a United States price of 20,000 U.S. Dollars to 25,000 U.S. Dollars depending on the market value of the technology in a specific country.

Having described the main programmes Schools Online was initiating to steer information technology development in schools in developing countries, it is crucial to take a closer look at the organisational capacity of Schools Online.

2.4 THE ORGANISATIONAL STRUCTURE OF SCHOOLS ONLINE

2.4.1 Structure

The structure of Schools Online reflects the corporate spirit and attitude in which it was created. Elahian, being a very successful entrepreneur from Silicon Valley,

¹⁸ AGL and GEMS

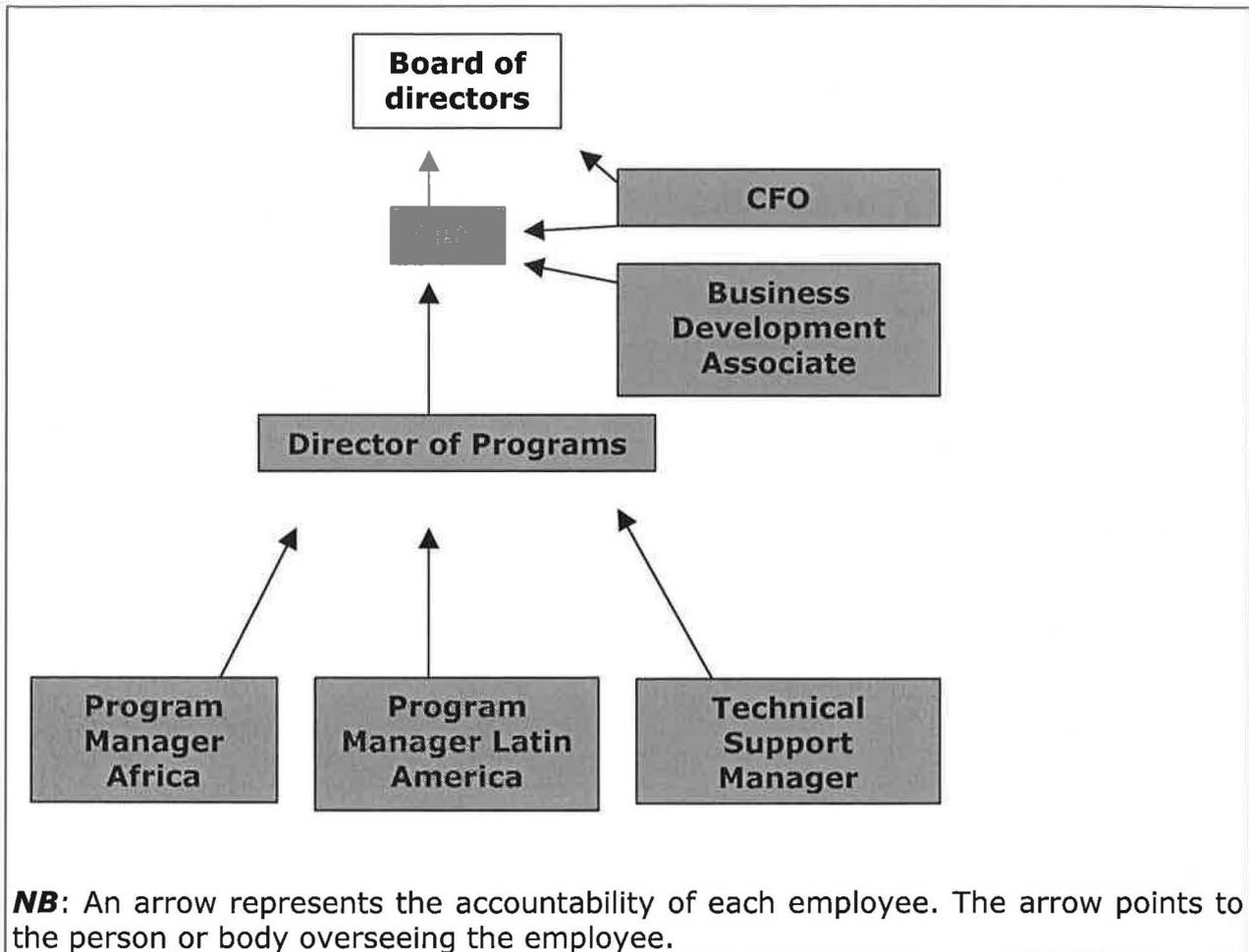
approached the process of starting a non-profit organisation the same way he had approached venture capital projects. When the idea was born, he found a partner and together they decided to establish a non-profit organisation called "Schools Online". Twelve board members were chosen from the personal network of the founder and all came from the corporate world of high-tech companies. Though they were exceptional in the highly competitive markets, they did not have experience in development work or in non-profit organisations. As the Programme Manager for Latin America, Zeledon (2002) mentioned: "From the beginning, the board played the role of a passive legal entity rather than an involved governing body". Zeledon (2002) added that with only a few exceptions, the board members did not take upon themselves the responsibility of fund-raising – a function that is instrumental in prosperous and healthy non-profit organisations. With time, the board shrank to seven members. It is notable that the CEO of Schools Online, as one of the board members, had full voting power. Although this is uncommon in non-profit organisations, it is quite frequent in the corporate domain, on which the organisational structure is based.

The core staff of Schools Online consists currently of seven full-time employees: A CEO, a Chief Financial Officer (CFO), a Director of Programmes, two Programme Managers, one Technical Support Manager, and a Business Development Associate. Additionally, there are consultants, volunteers, and an intern who assists the staff with the development of strategic planning, programme implementation, and other organisational functions. The present dissertation however focuses on the core staff of seven employees. All are located in the San Jose office, where the programmes are designed and evaluated.

¹⁹ See Appendix 1 for more detail

Below is a graphic description of the organisation, further clarifying the structure of Schools Online.

Diagram 1: Organisational Structure of Schools Online



2.4.2 Staff

The choice of employees attracted to fill positions at Schools Online reflects the location of the organisation as well as the new corporate philanthropy trend described previously. Silicon Valley is a very high-tech oriented community and

corporate souls and engineers are plenty. Enthusiasm of a new economy and inventive start-up companies taking serious economic risks within their own environment is mirrored in ideas supporting the rise of a non-profit organisation about to initiate international development programmes. Schools Online illustrates this when the researcher takes a closer look at the individuals employed.

The researcher will list all of the different full-time employees in sequence according to when they were hired. In other words, the study will start by naming and specifying the first employee at Schools Online.

As mentioned above the CEO of Schools Online was a personal friend of the founder and an active person in corporate Silicon Valley. The CEO however has no international development experience.

According to CEO Rahimi (2002): "...When building Schools Online's staff, it was more important to convene people with high-tech skills who understand computers and the Internet than to find people with international development experience." He (2002) continued by saying that Schools Online was, above all, an organisation focusing on *information technology* development in the South²⁰.

The following is the biography of the CEO as posted on the Schools Online web site²¹:

"Mr. Rahimi is a veteran of Silicon Valley, having spent twenty years in engineering and management with various companies including Emulogic, Unisys, Ampex, and Teradyne. Touraj has a Bachelor of Science and

²⁰ Rahimi emphasised the words "information technology" defining his specific focus.

²¹ Schools Online Staff. 2002. Available:

Engineering from Worcester Polytechnic Institute, Worcester, Massachusetts. His interests include classical music, skiing, and amateur physics.”

The second position to be filled was a Technical Support Manager, emphasising the focus of Schools Online as mentioned above. The Technical Support Manager was in charge of developing a blueprint technology solution appropriate for different settings and adaptable to various infrastructures all over the world. The person in charge of this effort, Broos (2002) highlighted to the researcher that he had not lived abroad, nor had he ever travelled outside the United States or Europe before his contract started at Schools Online. He did, however, have a tremendous grasp on the new technologies available as well as future technologies about to be marketed.

The following is the biography of the Technical Support Manager as posted on the Schools Online web site²²:

“Broos holds a Bachelor's degree from Sacramento State University in Geography with an emphasis in Geographic Information Systems and an Associate degree from the Technical Institute in Computer Network Systems Technology. John was class valedictorian and is a member of Alpha Beta Kappa. He is Network+ and A+ certified and is currently working on his Microsoft Certified Systems Engineer degree.”

For an organisation attempting to work in the international development field, there was a huge lack of experience according to Programme Manager for Latin America Zeledon (2002). He (2002) elaborated on this by giving himself as an example.

<http://www.schoolsonline.org/howeare/staff.htm#touraj> (accessed on 1 September 2002)

²² Schools Online Staff. 2002. Available:

Zeledon was born in Latin America, but his parents had left the continent when he was two. He ended up studying engineering at Stanford University but never returned to Latin America until his first trip for Schools Online. Schools Online hired him as the person responsible for developing information technology programmes for and with local Latin American schools. He was in charge of a one million-dollar budget providing information technology to two different Latin America countries he had never visited before. He was also responsible for the Schools Online programmes in India and Spain.

The following is the biography of Zeledon as posted on the Schools Online web site²³:

"Zeledon joined Schools Online in March 1999 as a member of the development team. In 2000, he joined the programme team to manage projects in Latin America and the United States. He has co-ordinated the installation of over thirty Internet learning centres in schools in Argentina, India, Spain, and Paraguay. In 1992, Rolando graduated with distinction from Stanford University with a Bachelor of Science in Mechanical Engineering. After completing his graduate studies at Stanford University, he received a Master of Science in Manufacturing Systems Engineering in 1994 and a Master of Science in Engineering Management in 1997."

Toumani (2002), CFO who had quite some experience working in non-profit organisations, admits that international development experience was not her focus before she joined Schools Online.

<http://www.schoolsonline.org/howeare/staff.htm#jbroos> (accessed on 1 September 2002)

²³ Schools Online Staff. 2002. Available:

The following is the biography of the CFO as posted on the Schools Online web site²⁴:

"Toumani, a graduate of Rutgers University, comes to Schools Online with over fifteen years of experience in accounting and non-profit organisation administration. Prior to joining the team at Schools Online, she worked for seven years as Director of Finance and Administration at Camp Fire Boys and Girls. She has served on the board of a number of non-profit organisations. Presently, she is Board Chair of South County Housing. After many years of admiring the programmes and achievements of Schools Online around the world, Monica says she could not think of a better organisation to work for. Monica is married and has three grown daughters."

Raising funds was not the main concern of an organisation with millions of dollars in the bank. However, Shah, who was hired as Business Development Associate, would focus on raising additional funds and tapping into the corporate philanthropy efforts of information technology corporations based in Silicon Valley. Very interested in the non-profit organisation world, Shah (2002) mentioned she was eager to start learning about international development while working for Schools Online.

The following is the biography of the Business Development Associate as posted on the Schools Online web site²⁵:

<http://www.schoolsonline.org/whoweare/staff.htm#rolando> (accessed on 1 September 2002)

²⁴ Schools Online Staff. 2002. Available:

<http://www.schoolsonline.org/whoweare/staff.htm#monica> (accessed on 1 September 2002)

²⁵ Schools Online Staff. 2002. Available:

<http://www.schoolsonline.org/whoweare/staff.htm#valeri> (accessed on 1 September 2002)

"Shah has lived in Northern California for most of her life. Since graduating from Berkeley University in 1999, she has worked in the non-profit organisation sector at a community health clinic and the San Francisco Unified School District. Ms. Shah also volunteers her time with a few other non-profit organisations, Charity Focus and Education First. Her outside interests are indoor rock climbing, reading, and skiing."

In 2000, a Director of Programmes was hired to oversee the Programme Manager for Latin America, the Technical Support Manager and the Programme Manager Africa²⁶. He brought years of experience to Schools Online. Yocam had worked for Apple Computers, introducing computers and the Internet to schools in Europe and the United States. Very respected in Silicon Valley, he added relevant value to a slow-growing team of young idealistic individuals according to Rahimi (2002).

The following is the biography of the Director of Programmes as posted on the Schools Online web site²⁷:

"Yocam, Director of Programmes for Schools Online, directs the development and implementation of programmes that provide technology grants and facilitate professional development to schools in disadvantaged communities world-wide, providing them with access to the communication and information resources of the Internet.

In 1986, Yocam joined Apple Computer's Apple Classroom of Tomorrow (ACOT) programme. Initially, Yocam was responsible for the development of the ACOT research sites, technology training, and implementation of the

²⁶ Mentioned below

²⁷ Schools Online Staff. 2002. Available:

programme's research agenda. In 1992, ACOT received a grant from the National Science Foundation to create and study a model of professional development. As a senior scientist in Apple's Advanced Technology Group, his research examined the impact of situated teacher development on teacher change and their use of technology for learning. In 1993, Yocam became ACOT's World-wide Programme Manager, directing the programme's expansion to include research sites in Europe and Australia. Previous to joining Apple, he had eleven years of experience as an elementary teacher, science resource specialist, and computer mentor teacher."

Yocam was instrumental in hiring a Programme Manager for Schools Online's African programmes. In June of 2000, Rubens joined the team of Schools Online.

The following is the biography of the Programme Manager Africa as posted on the Schools Online web site²⁸:

"Rubens joined Schools Online in June 2000 as a member of the programme team to manage projects in Africa. From 1998 to 2000, he worked and lived in Africa, where he initiated an AIDS information and counselling centre with people of Phagameng, South Africa. He has co-ordinated the installation of over eighty Internet learning centres in schools in Uganda, Zambia, Ghana, Senegal, South Africa, Tanzania, Kenya, and Zimbabwe. Rubens graduated from law school in Belgium and is currently enrolled for a Masters in Development Studies at the University of South Africa."

<http://www.schoolsonline.org/whoweare/staff.htm#keith> (accessed on 1 September 2002)

²⁸ Schools Online Staff. 2002. Available:

<http://www.schoolsonline.org/whoweare/staff.htm#joop> (accessed on 1 September 2002)

Even though the staff represented some non-profit organisational experience, as well as some minor international development experience, the main strength of the staff was in information technology. Little attention was paid to compiling a staff sophisticated enough to initiate cross-cultural projects in very challenging environments. Many of the employees realised and admitted that Schools Online lacked understanding of cultural complexity as it accompanies international development programmes.

As Schools Online built a team prepared to work in the international development scene, it felt ready to put together a mission and express a vision.

2.5 VISION

From its inception, Schools Online did not have specific methods to achieve its goals and objectives. A strategic plan, operational plan, or marketing strategy simply did not exist.

To the founder and CEO it seemed simple and straightforward to distribute technology to schools in the South. As founder Elahian (2002) revealed: "We find schools in developing countries where people have no access to the Internet and computers and we bring them these tools so the students can become part of a global dialogue." As Schools Online evolved and various employees were hired, this changed, at least on paper.

The decision to initiate the development of strategic and operational plans came after Schools Online got involved in creating a shared vision among its employees.

In the winter of 2001, a culmination of thoughts after an organisational retreat led Schools Online to publish the following statement on their web site²⁹:

"Schools Online is committed to working with under-resourced schools to build sustainable programmes and models that support students' use of information and communication technologies to enhance their learning. Our programmes provide the means by which students can connect to the Internet and participate in cross-cultural dialogues and projects world-wide. We have learned that three basic elements are necessary to promote effective online communication among students: Technology, teacher development, and cross-cultural collaborative projects.

Technology:

Schools Online selects schools that reflect a fair representation of a country's demographic and geographic diversity and have limited or no access to the Internet. Schools Online works with schools to determine the most appropriate technology and connectivity solutions to meet their needs and then provide technology to create Internet learning centres (ILCs). In general, ILCs are comprised of ten or more Pentium-class personal computers, two printers, a scanner, a digital camera, and router. They are installed in schools, usually by local vendors.

Teacher Development:

Schools Online works with local and international education partners to identify teachers and trainers with experience in teaching technology skills and project-based learning activities. These partners provide basic computer

²⁹ Schools Online Programs. 2002. Available:
<http://www.schoolsonline.org/whatwedo/index.htm> (accessed on 1 September 2002)

and Internet training, teacher professional development, management of online collaborative projects, maintenance of online teacher and student communities, and general support to teachers.

To insure that the Internet is used to its fullest potential, teachers learn how to integrate the Internet into their daily classroom activities. In workshops, teachers learn computer skills, about online educational resources, web site design and development, and how to design online collaborative projects.

Cross-cultural Collaborative Projects:

Collaborative projects provide an effective format for students to communicate with their peers world-wide on issues that effect their lives today and in the future. Schools Online encourages projects that exemplify international, Internet-based collaborations that greatly enhance quality and frequency of communication among students. For examples, see projects listed in the collaborative project page.

Schools Online considers everyone involved in Schools Online programmes a partner. From students and their parents to ministers of education, everyone has roles and responsibilities that keep Schools Online's programmes growing in the most effective directions. Teachers and administrators, vendors, Internet service providers, local communities, funders, and business partners all play an important part in the Schools Online effort."

In short, the vision reflected the well-thought-out mission as follows³⁰:

³⁰ Schools Online Mission. 2002. Available:
<http://www.schoolsonline.org/howeare/mission.htm> (accessed on 1 September 2002)

“Our mission is to help students gain access to and use the communication and information resources of the Internet for learning and cross-cultural dialogue.

We accomplish this by:

- Providing appropriate technology and Internet access
- Facilitating teacher professional development
- Cultivating online educational and cross-cultural projects
- Developing locally-driven and sustainable Internet learning centres
- Sharing our knowledge and experience”

The mission and vision which developed on paper were far removed from the founder’s simple premise and stressed the complexity of the programmes. The words published on the web site reflected carefulness within Schools Online. The steering of information technology development of schools in the South seemed to be recognised by the employees of Schools Online as a delicate and difficult challenge.

2.6 CONCLUSION

Schools Online was born out of an entrepreneurial vision. A wealthy businessman from Silicon Valley who adhered to a “new” form of corporate philanthropy initiated it. Having been very successful and effective in the corporate world the founder of Schools Online felt compelled to act on his life’s dream. The dream of Elahian (2002) seemed simple: “Connecting as many students as possible in the developing world to the Internet thereby contributing to a global dialogue.” Rahimi (2002) told

the researcher he personally wanted to "reach one million children by the year 2004".

Corporate "effectiveness" is usually measured in numbers, while sometimes forgetting to measure quality. Applied to philanthropy, this value simplifies the complexities of international development work. Pressures for immediate quantifiable results forget institution building and make it difficult to move beyond a welfare approach to poverty. Korten (1990:113-125) explains that in the past, relief and welfare work was the base from which non-governmental organisations operated. This strategy implied that more attention was being given to curing the symptom than to the real cause of a problem. If a person is hungry you "solve it" by providing him with food, whilst neglecting the social and economic issues which cause hunger. In this work, the non-governmental organisation was the active partner and the beneficiary was reduced to a passive receiver. The current general opinion in community development, however, is that this work only suits emergency-situations, and even then it will only create temporary relief.

At its inception, Schools Online seemed to see the world, as hungry for information. The symptom was a lack of information technology. Schools Online intended to respond and meant to assist development by filling in the information technology void. However, as people were hired and the organisation built a plan, it became clear on paper that steering the information technology development in Sub-Saharan Africa is more complex than merely dropping computers into schools.

CHAPTER 3

INFORMATION TECHNOLOGY DEVELOPMENT IN SUB-SAHARAN AFRICA

3.1 INTRODUCTION

When writing about a Silicon Valley-based organisation steering information technology development in Sub-Saharan Africa, one needs to clarify what the scope of the term "development" will entail with regards to the study. Without going too deep into the debate about the exact definition of "development" the researcher will highlight how Schools Online understands and defines the concept.

Since information technology in this study entails computers, its periphery and the Internet, the researcher will debate the questions below and describe the complexity of absorbing the specified technology into Sub-Saharan Africa in general.

When distributing information technology, one needs to consider a number of factors. Does the infrastructure of rural Africa allow for a swift spread of the Internet, understanding that the Internet demands a good quality telephone infrastructure as well as a personal computer? With many rural as well as urban communities in the South lacking access to telephone lines, can we realistically expect widespread use of the Internet? Does traditional African culture allow for computers to become a part of daily life? Is the Western-biased information on the Internet relevant to the people of Africa? Are the many languages of the various countries in the South represented on the Internet? Is the Internet user-friendly for an African? Does a low level of literacy pose a problem in regards to the Internet?

3.2 DEVELOPMENT

The researcher will recapitulate what was expressed in Chapter 1. The word "development" has become a buzzword that is often abused by international institutions trying to gain credibility for specific activities in the South. Even though we seem a long way from modernisation theory and the defining of development according to Western standards, there is still much disagreement about the true meaning of the word. Many theorists expand on various definitions of the term. In Chapter 1, the study mentioned the following three types of definitions put forth by Kotze (1983:13):

- Empirical: Referring to actual results of development. Examples: Economic growth, improvement in educational and health services, better nutrition, and other social indicators.
- Operational: Describing what should be done to achieve a condition of full development. an operational definition of development has a future vision and projects into the future. Examples: Visualising a new and improved communication system, structures for maintaining peace, new household aides, and medical services.
- Moral: A moral definition of development will intrinsically be idealistic and will prescribing an ideal society as it measures up to a particular value system.

With the scope of this study, "development" is considered to be more than merely economic progress. The gross national product of a country will not be the main argument of development. "Development" also entails social, political, and most importantly in terms of this dissertation, technological advancement.

The focus will be on what information technology means for Schools Online. The infrastructure, human capacity, and cultural context of Sub-Saharan Africa pose a challenge when attempting to install computers and the Internet in schools.

3.3 HOW SCHOOLS ONLINE UNDERSTANDS DEVELOPMENT

Schools Online's culture as described in Chapter 2 reflects the location of the organisation and its Internet start-up enthusiasm. In Silicon Valley, people feel close to the centre of their universe. Stanford University is called "ground zero", and Steve Jobs, Hewlett Packard, and IBM are household names. San Jose is the place where "it" all began according to local people. "It", of course, being the computerisation of the modern world.

In a place where people can do most of their daily tasks online, the Internet and computers are seen as prerequisites for development. Information technology is an integral part of life and dictates the power people have over the forces that shape their lives. Access to the Internet is seen as a basic right people should have all over the globe.

Silicon Valley thrives on the computer industry, which in turn becomes more and more revolutionary due to brilliant engineers drawn here from all over the world. Most of the residents of San Jose and its surroundings see this technological advancement of their area as the future for everyone. This optimism is most likely reminiscent of 19th century Europe. Digitising the rest of the world will follow, according to the United States, and modernity is only a computer and a connection away.

Marx (1976:91) wrote in *Das Kapital*: "The community that is more developed industrially only shows, to the less developed, the image of its own future." Today in Silicon Valley people see the digitising of the world as its prospect. Development, by many in Silicon Valley, is defined in terms of technological progress. John Katz (1998:224) writes: "The people rushing toward the millennium with their fingers on the keyboards of the information age could become one of the most powerful political forces in history."

Schools Online, a Silicon Valley-based organisation, adheres to the above. According to Elahian (2002) the world cannot stop the digitisation of services; the free flow of information that accompanies the Internet is unstoppable. He added: "As we move into the 21st century a country's development will depend on its information technology infrastructure." Elahian (2002) explained that people deserve the right to access the Internet. If Schools Online brings computers and Internet connectivity to a school in a rural town in Africa, its students would be able to voice opinions and access virtual libraries as well as be in touch with overseas students. Farmers in that village could be informed about the latest techniques in agriculture, women could find ways of empowerment, and artists could attempt to sell art on the Internet without having to lose profit to a "middle man". Freedom of speech, gender equality, access to information and the right to fair economical freedom would be among the human rights protected by such a project. Similar projects would potentially change the future of the beneficiary communities on an ongoing basis. The information technology development steered by Schools Online could, as such, positively contribute to the social-economic and political development of communities in the Sub-Saharan Africa.

3.4 WHAT IS INFORMATION TECHNOLOGY FOR SCHOOLS ONLINE

For Schools Online, information technology represents computers and the Internet. More specifically, information technology is understood as a small, networked computer laboratory consisting of the following³¹:

- A Central Processing Unit, with the necessary attributes
- A monitor
- Two printers: One ink-jet printer and one laser printer plus the necessary cabling
- A hub
- Network cable
- An uninterrupted power supply
- A scanner
- A digital camera
- Diskettes
- A modem or router

As well as the needed software:

- An operating system
- An Internet browser
- Multimedia tools and anti-virus software
- Proxy software

³¹ See Appendix 1 for more detail

For Schools Online to fulfil the idea of global communication, an Internet connection is important. Schools are usually assisted with the initial costs of an Internet connection. Ongoing costs are then the responsibility of the schools.

Schools Online assumes it has developed a blueprint technology solution appropriate for any school in the world³². At this stage, the researcher invites the reader to take a closer look at "Appendix 1", as it describes the donated technology in detail. "Appendix 1" also provides a suggestion as to how the receiving school could set up the Internet learning centre.

3.5 THE REALITY OF INFORMATION TECHNOLOGY DEVELOPMENT IN SUB-SAHARAN AFRICA

3.5.1 Introduction

As described in Chapter 2 of this study, in Silicon Valley, and subsequently within Schools Online, people are convinced of the benefit information technologies could bring to developing countries. In fact, Schools Online assumes the spread of computers and Internet is a certainty and countries lagging may remain behind. Chances for development and progress are determined by digitisation. However, Sub-Saharan Africa reflects a very different reality when compared to life in San Jose, California.

The following paragraphs will touch on some of the possible difficulties and obstacles one can expect when steering an information technology development project in Sub-Saharan Africa.

³² See Appendix 1 for more detail

3.5.2 Lack of Infrastructure

Can information technology be expected to grow optimally in a Sub-Saharan African context, realising that it was developed in the North and made with a Northern infrastructure in mind?

Personal computers need electricity to operate. In Silicon Valley, electricity is a basic need and is widely available. Large parts of Africa however are rural, with small tribes and much of the population living fairly far removed from the conveniences of cities. Towns in Western Tanzania, for instance, often do not have electricity, and in cases where there is power, it is often extremely expensive. This implies computers would not be able to run unless an alternative power solution³³ is provided.

In the event electricity or an alternative source of power is provided, the personal computer will be operational. However, connecting the personal computer to the Internet will also demand a telephone line and these are scarce in Sub-Saharan Africa.

Hilliard (2002:4), professor of Media Arts at Emerson College in Boston, Massachusetts writes: "Sub-Saharan Africa, excluding South Africa, is one of poorest regions of the world. While some countries were left a remnant of a telecommunication infrastructure on which to build by the colonial powers that occupied them for many years – in the east it was the United Kingdom, in the west it was France – most were left with nothing but a poorly run, under-funded, technically deteriorating radio system. After they gained their independence, the former British and French colonies used whatever systems they had in the same

³³ Solar, wind, hydro-electricity, and/or generator

way the colonial powers had used them: To maintain control over the people through nationalistic education and propaganda.”

Today, Sub-Saharan African countries are still struggling to introduce forms of information technology. However many Sub-Saharan African nations seem to have adopted the idea of “bridging the digital divide”. Still, no matter how enthusiastic African people and their governments are about the Internet, the reality remains that the Internet needs a basic communication system often not found in many parts of Sub-Saharan Africa. As Hilliard and his colleague Robins (2002:VIII) write: “With about 13 percent of the earth’s population, Africa has only 2 percent of its telephone lines; Sub-Saharan Africa has about 10 percent of the world’s population and only about one-half of 1 percent of its telephone lines.” Hilliard (2002:3) emphasises this by writing: “Excluding South Africa there are only three million lines in the rest of the region, i.e., one telephone for every seventeen thousand persons. Further, telephone rental for a year averages about 20 percent of the average capital income of the region. Compare that to the world average per capita yearly income and one telephone for every six hundred people.”

Hereafter is a table provided by O’Connor³⁴ (1998:272) explaining the difference in telephone line infrastructure and personal computer distribution in Sub-Saharan Africa as compared to the United States in particular.

³⁴ O’Connor is the Washington correspondent covering technology policy issues for Silicon Valley’s biggest newspaper, the San Jose Mercury News.

Table 1: Telephone and Personal Computer Infrastructure of United States versus Sub-Saharan Africa

Country/Region	Telephone lines/per 100 people	Personal computers per 100 people
United States	61	40
Sub-Saharan Africa ³⁵	0.46	N/A

Does this imply Africa is to be left behind when it comes to cyberspace? Enthusiasm at the national political level in African nations with regards to the information technologies today argues the opposite. Many African governments are convinced of the benefits the Internet has to offer and are privatising previously nationalised communication sectors, creating a competitive market where liberalised companies attempt to reach more people at lower costs. This, in turn, may soon offer a better infrastructure needed for the spread of Internet.

Meanwhile, international organisations are attempting to evade lack of telephone infrastructure through innovative technology solutions. For instance: As a response to a lack of telephone lines in Uganda, Schools Online in partnership with the Gates Foundation, USAID, and WorLD introduced wireless technology. Very small aperture terminals (VSAT's) were installed in rural schools in Uganda eliminating the need to install telephone lines. Satellite terminals could help very remote villages in Sub-Saharan Africa overcome landline gaps. There is huge progress being made in

terms of wireless equipment³⁶, but we are still distantly removed from a solid, affordable, and reliable answer to the lack of telephone lines.

Information technology assumes more than just a material infrastructure. Computers can break down, the Internet can spread viruses, and printers often refuse to print. This is particularly true in Sub-Saharan Africa's very harsh climate. Extreme heat, plenty of dust, and sudden thunderstorms are hard on computers and Africa lacks people educated to work on and repair computers. Bringing in a water pump without training people how to fix the water pump has been experienced before. It is therefore crucial that development efforts recognise this lack of the human resources needed to provide technical backup and offer training with materials.

3.5.3 A Different Cultural, Social, and Political Reality

Some people have stated that the Internet is just another form of cultural imperialism well on its way to destroying whatever tradition Africa has left. Maybe more important, a closely related argument raises the question as to whether the Internet can be seen as another route by which Western values compete and even come to substitute indigenous ones. This, in conjunction with the fact that face-to-face, personal interactions may suffer and be largely replaced by virtual discussions and increased but de-personalised communication, has brought people to advocate thoughtfulness in the optimism of cyberspace. If one acknowledges the tremendous benefits of communal life in Africa and recognises the manner in which it contributes to the sustainability of communities, one has to question if computers will intrude on, if not destroy the latter. Neill (1998:422) who wrote widely on education and assessment issues is fairly direct: "The computer is the extension of

³⁵ South Africa included

the "white man." Devoid of emotion, disconnected from the body, (...) non-nurturing and unmusical, the type of the "white man" excludes all the human traits capitalism has attached to women and people of colour, particularly Africans."

In certain instances, local people may not be as impressed with information technology as the donor organisation or the national government is. By introducing information technology in a school in Sub-Saharan Africa, we may find the students researched to be strongly influenced by American and European ideas. Some may admire this formation of what could be called "hybrid cultures", others however may argue that this influence could be obstructive to the sustainability of the community at large. And more specifically, that the maintenance of computers would suffer, since school administrators and parent-teacher associations may not see the social benefit. The ongoing financial burdens accompanying connectivity and maintenance may not seem worth bearing the high cultural costs. As Zeledon (2002) described by way of an example: "Elderly tribesmen from a rural town in Zambia destroyed computers donated by an outside donor organisation fearing the technology was devastating to young people's agricultural motivation."

The fact that the Internet is most accessible in Europe, Japan, and the United States and subsequently, the fact that most of the content on the World Wide Web was developed in those areas, brings up the question of relevance. How relevant is information technology development for the average Sub-Saharan African?

Knowing that the majority of information on the Internet is provided by and for America and Europe: Do people of various towns and cities in Sub-Saharan Africa see the advice given by Americans and Europeans as valuable to their lives? There

³⁶ VSAT and spread-spectrum wireless in particular

is a vast amount of information on the Internet, not all of it factual or useful. How much of it is relevant to a Senegalese for instance, and how much is Euro-centric?

As Hillard (2002:5) mentions: "A problem encountered in most countries is the multiplicity of languages spoken by different tribes. Although English in the south and French in the west are the official languages, and in some areas Kiswahili crosses internal and external borders as a second language, many isolated groups know only a tribal language." How accessible are web sites, knowing that the majority are produced in the English language? There are of course web sites produced by African organisations and institutions, but they are scarce compared to the number of sites produced in the United States. There are also more and more French and Spanish sites, but the researcher has yet to come across the first traditionally African language web site. This lack may, of course, be the direct result of the digital divide these development efforts try to bridge. An information technology project in a Sub-Saharan African school could help African students transcend the information gap, allowing them to create a user-friendlier Internet for their communities. This in turn would contribute to its relevance by providing an argument to local people for sustaining such initiatives. Opponents will argue that the Internet is Northern-centric and that Africa will never benefit from this technological revolution, concluding that funds spent on introducing high-end information technology could be spent more wisely. They may question: Will it be students and farmers in Africa, finally able to access irrelevant information previously unavailable, who will benefit from information technology projects, or will it be computer companies and many Internet-based companies with corporate seats in the Northern nations? Samir Amin (1996:1), known for his critiques on corporate imperialism and himself presently a resident of Dakar, Senegal, agrees in a speech presented during the summit *Africa and the new Information Technologies*

in Geneva: "L'importance des enjeux est telle que les grandes multinationales y voient la source potentielle de profits financiers majeurs".³⁷ Quite a number of sceptics have expressed similar doubts about information technology development in Sub-Saharan Africa. Winner (1998:233), professor of political science at Rensselaer Polytechnic Institute³⁸, writes: "The computer romantics are [...] correct in noting that computerisation alters the relationships of power and control, although they misrepresent the direction this development is likely to take. Those who stand to benefit most obviously are large transnational business corporations".

Another social aspect important to discuss here is the oral tradition of the majority of Africans. Radio has been extremely successful in Sub-Saharan Africa, since it is low in cost and respects a high level of illiteracy. Computers and the Internet on the other hand, demand that a user be able to read and write. On a continent where a majority is not able to read, one needs to question the social appropriateness of a tool demanding literacy. Computers and the Internet still expect users to be literate and could therefore contribute to the gap between literate as opposed to illiterate people unless they are used as tools in education and could, as such, help augment literacy rates throughout Sub-Saharan Africa.

The question remains, however, as to whether Sub-Saharan African schools and teachers in particular are ready for this tool. Dropping computers into Sub-Saharan African schools while, for instance, denying gender imbalances present in an education system may cause reinforcements of these imbalances. Chen (1995:24) mentions that in the least developed countries there are an average of 32 percent adult female literacy. And only forty-two women for each one hundred men have done an average number of years of schooling. Ignoring this may in turn affect

³⁷ Translation of quote by Samir Amin: "The importance of what is at stake is that the big multinationals see it as a potential source of major financial profits."

overall success of information technology projects. Throughout Africa, women have been found to be most concerned with family issues. The parent-teacher association in many schools will consist mostly of women. If the majority of members of the parent-teacher associations never received a chance to understand the value of information technology, how can we expect them to financially and socially support projects involving computers and the Internet. As Gittinger, Chernick, Horenstein and Saito (1990:9) emphasise: "Education appears to increase the ability and willingness to reallocate resources efficiently when prices or technology change."

Another obstacle that may surprise a United States-based organisation in its activities to steer an information technology development project in Sub-Saharan Africa is the political context. African leaders are very aware of the axiom that whoever controls the media of a country controls its politics. The content on the Internet is very hard to control. Even though a lot of African governments seem seduced by the benefit of the Internet, they have become increasingly concerned about the lack of control it holds. As Hilliard (2002:12) writes: "Only as a country becomes democratically stable - and there is a dependency upon economic stability as a prerequisite - has it been able to lessen its grip on telecommunications. The poverty of most of Africa has made it difficult, if not impossible, to find affluent enough private enterprise within a given country able to develop telecommunication systems, thus ceding that responsibility to the government. The high rates of illiteracy, poverty, illness and disease, mortality, hunger, and births - much higher than that of the Western nations - require ubiquitous means of reaching out to widely scattered and geographically isolated groups with information and education, as well as propaganda, in order to maintain a base of economic and cultural development. Not least is the governments' need to control the media as a means of staying in power."

³⁸ Based in New York

3.6 CONCLUSION

Chapter 3 focused on information technology as well as the Sub-Saharan African reality an information technology development project will encounter.

Realising the present position of many African countries makes one understand how challenging introducing information technology would be. In comparing Africa to life in Silicon Valley the researcher brought up extreme differences. Studying the vision of an organisation based in an area that is technologically very advanced in its attempt to introduce what it perceives as crucial technology unveiled a number of possible complexities.

Enthusiasm in California risks ignoring the needs and realities of Africa. The manner in which Schools Online perceives development and in which it focuses on technological progress seems very limited. In fact, it is reminiscent of modernisation theory and jeopardises valuing much of the social and cultural complexities that make up a society.

CHAPTER 4

A FOCUS ON A SCHOOL-BASED INFORMATION TECHNOLOGY PROJECT IN A UGANDAN SCHOOL

4.1 INTRODUCTION

For the steering of information technology development in Sub-Saharan Africa to be appropriate, computers will need to be seen as instrumental in the overall empowerment of a "benefiting" community. Responding to a local need will be prerequisite to generating ongoing local support for a school-based information technology project. The usefulness of the Internet will depend on the needs of the community and on how well computers and the Internet can respond to those needs. Some questions to consider are as follows: Are Schools Online and its founder creating needs by introducing luxury technology to communities that have different and more pressing needs? Are Africans supportive of the idea of computers and the Internet in their schools? Is the beneficiary involved in planning the project? Do people feel a school-based computer laboratory could contribute to the empowerment of the community at large?

Will the introduction of expensive technology by a United States-based organisation bring too heavy a burden to the schools, in turn denying true development and discounting possible other more appropriate responses to local needs? In this chapter, the researcher will study the response to the activities by Schools Online by way of a case study done in a school in Uganda.

4.2 SHORT INTRODUCTORY BACKGROUND ON UGANDA

Without expanding in great detail on Uganda as a country, the current study will mention a few crucial factors with regards to Uganda's "poverty level" and "communication politics". In turn, these factors clarify the context in which the researched school must be seen.

According to the World Bank, Uganda's total population equalled twenty two million in the year 2000, growing at a rate of 2.8 percent between 1980 and 2000³⁹.

The World Bank web site⁴⁰ goes on to state that the gross national income in Uganda in the year 2000 was 6.7 billion U.S. Dollars. The average income in 2000 was 300 U.S. Dollars per person and the average annual growth rate of the gross domestic product in Uganda between 1999 and 2000 was 3.5 percent. Infant mortality rate stood at a high of eighty-three per thousand live births in 2000, with one hundred and sixty one children per one thousand born dying before they reach the age of five. The adult illiteracy rate in 2000 of men age fifteen and over equalled 43 percent. For women this was marked at 22 percent.

Jensen, a South African respected for his knowledge of the telecommunication sector throughout Africa, explains⁴¹ that with only sixty-five thousand telephone lines in the country, Uganda's fixed line network is at a very low level of development. The independent regulator for the communication sector is the Uganda Communications Commission (UCC), which also operates the Fund for Rural

³⁹ Sub-Saharan Africa: A focus on Uganda. 2002. Available:
<http://www.worldbank.org/html/schools/regions/ssa/uganda.htm> (accessed on 13 September 2002)

⁴⁰ *ibid.*

⁴¹ AISI-Connect National ICT Profile UGANDA (UG). 2002. Available:
http://www2.sn.apc.org/africa/countdet.CFM?countries__ISO_Code=UG (accessed on 13 September 2002)

Communications Development. Telecommunication operators have an obligation to deliver telecommunication services to the local county level by legislation. The UCC falls under the Ministry of Works, Transport, and Communications. Jensen adds that the communication sector in Uganda has been extensively liberalised. In February 2000, a consortium led by the German firm Detecon beat two rival groups to win a 51 percent stake in Uganda's state-owned telecommunications company. Detecon, which is partnered by Swiss-based Telcel and South Africa's Ikwezi group, put in a winning bid of 33.5 million U.S. Dollars to buy the majority holding in Uganda Telecommunications Ltd.

The political and economic realities in Uganda are clearly in stark contrast to life in Silicon Valley. An area in California where according to Newman (2001:62) a median household income reaches 64,650 U.S. Dollars and where houses cost 540,000 U.S. Dollars on average will certainly experience different needs and face different problems compared to Uganda.

Depending on the amount of local involvement in the planning phase of a particular project, an organisation initiated and formed in such a different cultural, social, and political setting may well be incapable of respecting obstacles appropriately when steering an information technology project in a Ugandan school.

4.3 A SCHOOL-BASED INFORMATION TECHNOLOGY PROJECT IN UGANDA

4.3.1 Uganda Project

Schools Online, through its partnership with WorLD and iEARN, initiated a pilot project in Uganda. Rahimi (2002) described the main purpose of the project: "To develop the information technology infrastructure of rural areas in Uganda".

Often development projects will stay close to the little available infrastructure of countries in the South. Moving outside of capital cities is generally an exception, and rural areas are usually overlooked by development agencies. It is recognised that most work is conducted in easily accessible areas and during convenient times only. As Chambers (1983:4) writes: "Outsiders have their own interests, preferences, and misconceptions, their own rationalisations, their own defences for excluding or explaining the discordant or distressing." This leads development organisations to only investigate certain issues, in specific places at pre-set moments in time.

This Schools Online pilot project, however, intended to defy the latter and selected ten rural schools in Uganda offering a complete information technology solution.

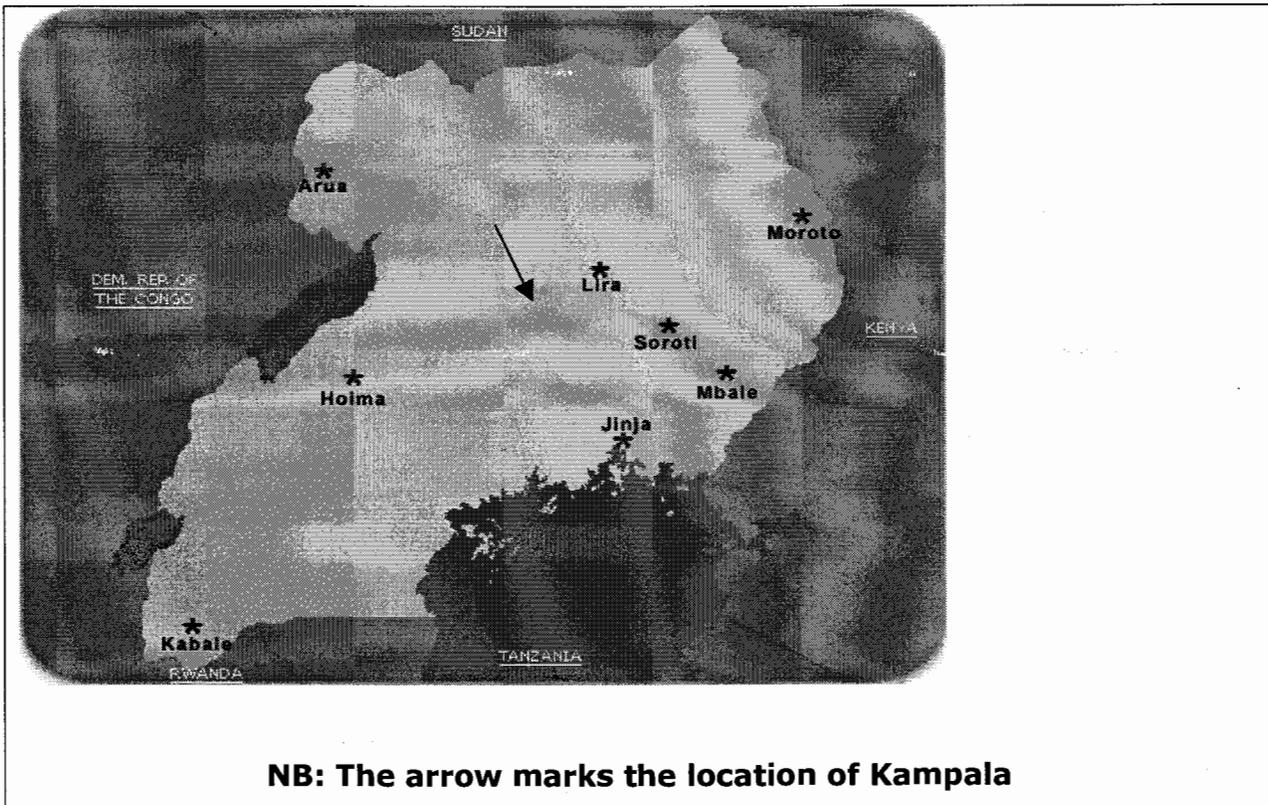
On the following table are the names and locations of the ten participating schools in Uganda. The Minister of Education in Uganda selected the schools. The Department was asked to select schools that lacked telephone lines and schools that were removed from the Kampala area.

Table 2: Participating Schools in Uganda

Location	School name
Jinja	Kiira College Butiki
Jinja	Wanyange Girls School
Jinja	PMM Jinja Girls School
Jinja	Jinja Secondary School
Mbale	Mbale Secondary School
Hoima	Duhaga Secondary School
Lira	Lango College School
Moroto	Moroto High School
Soroti	Teso College Aloet
Arua	Muni NTC Arua

Diagram 2 gives the reader an impression of actual school locations. All were selected outside of Kampala with some very far removed from any modern-day infrastructure such as telephone lines or electricity. Below is the map as it is posted on the Schools Online web site⁴²:

Diagram 2: Map of Uganda Highlighting School Locations



As mentioned above, Schools Online had developed a networked Internet learning centre⁴³ that it saw fit and appropriate for any circumstance. The donated computers and installed periphery in the Ugandan schools were no different. To

⁴² Schools Online in Uganda. 2002. Available: <http://www.schoolsonline.org/whatwedo/uganda.htm> (accessed on 19 September 2002)

read the precise detailed list of computer equipment donated in the case of the Ugandan schools, the reader is referred to Appendix 1. All the equipment was purchased from a local vendor in Kampala who brought the goods to the schools and installed the Internet learning centre.

Internet connectivity had to be innovative considering the remoteness of the sites. With a lack of telephone infrastructure and no availability of cellular technology, Schools Online was forced to bring in high-end wireless technology. Elahian (2002) mentioned: "Schools Online was certain to effectively bring Internet connectivity to classrooms in rural Uganda". Elahian (2002) admitted that the challenge made him more determined. After recommendations made by a group of wireless technology experts in Silicon Valley, it was decided that VSAT's would offer the best solution.

According to Schools Online Programme Director, Yocam (2002), Schools Online could tackle two obstacles through introduction of VSAT technology in Ugandan schools. First, satellite dishes would be used to overcome the lack of telephone lines. However, he (2002) went on to say: "The Internet provides access to a world-wide encyclopaedia that is unimaginable and unattainable to nearly all teachers and students. Most of the fortunate few who can use the communication and information resources of the Internet must endure slow access and download times, making its use more of a novelty than a practical learning tool. Without adequate bandwidth, the majority of teachers and students may never capitalise on the Internet's potential to bring the world's library into their classrooms or to incite conversations among students of different cultures."

The Ugandan pilot project aimed at addressing this challenge, provides connectivity using VSAT's, which are small satellite ground stations. The connection to the

⁴³ See Appendix 1 for more detail

Internet works via geo-stationary satellites and a back-haul to a high-speed link in the United States. Students and teachers are thus able to enjoy high-speed Internet access. An important point to make is that even though all of the equipment was donated, the schools would have to take care of the ongoing cost⁴⁴ once the equipment was installed and training was done. VSAT's, however, made monthly connectivity costs so high that Schools Online's partner organisation WorLD committed to paying half of the 400 U.S. Dollars per month for the first two years of the project. The average income in Uganda according to the above numbers published by the World Bank⁴⁵ was 300 U.S. Dollars per person in 2000.

Without questioning the intentions of Schools Online, would the students and the teachers benefit from the project and would the models constructed in a room in Silicon Valley be appropriate once they were brought to life in a Sub-Saharan African setting?

The next phase of the study will relate experiences in one of the schools in Uganda as described by its students and teachers. The school chosen for this focus is based in Jinja. The researcher had a chance to observe a school's responses to the information technology as it was donated to them by Schools Online. Access to one school in Jinja⁴⁶ gave the researcher a chance to informally interview and ask questions of students and teachers as well as sit in on an information technology meeting the school had planned during April 2002. The students, principal, and teachers opted to stay anonymous.

⁴⁴ Paper, ink, electricity and monthly connectivity bills

⁴⁵ Sub-Saharan Africa: A focus on Uganda. 2002. Available:

<http://www.worldbank.org/html/schools/regions/ssa/uganda.htm> (accessed on 13 September 2002)

⁴⁶ The school opted to stay anonymous.

4.3.2 School in Jinja

4.3.2.1 Introduction

Jinja is a small town about one hundred kilometres from Kampala. The researched school has about three hundred students, twelve teachers, and one principal. The school is connected to the electricity grid but lacks telephone lines.

The donated computers and periphery were installed in the school in late 2001. Even though the project was initiated in early 2001, the school had to wait for Internet connectivity until the start of 2002. Installing VSAT's at different sites throughout Uganda and connecting them to an Internet Service Provider in the United States took longer than Schools Online had expected. The current study however, will not expand on obstacles of purchasing equipment in Uganda and logistical difficulties of disbursing satellite dishes in a developing country. Instead the study will focus on the reception of technology and reflect the standpoint of "beneficiaries" after installation was done.

When the researcher was present in April 2002, the school had been using computers for four months and had enjoyed high-speed Internet for a few weeks.

Having conducted interviews with a group of thirty-three students, every teacher, and the principal⁴⁷ this research will clarify that even though the general feeling at the school was one of excitement and enthusiasm, some teachers, and the principal in particular, were fairly concerned about the future drain of funds high-end technology could bring to the school. The principal was quite critical of Schools Online's planning methods. Students on the other hand, in general obviously less

⁴⁷ A total of 46 individuals

concerned with administration and financial running of the school, saw computers and the Internet mainly as truly beneficial additions to the school.

Interviews conducted with forty-six individuals aimed at finding out the perspectives of the "beneficiaries" regarding *how the donation was being perceived on the ground; the response to local needs by Schools Online; appropriate planning by Schools Online; and the consequences of accepting information technology as distributed by a United States-based organisation.*

4.3.2.2 Enthusiasm and Concern

Even though 100 percent of those interviewed replied positively when asked if computers and Internet respond to a need in the school, some expressed concerns. Students as well as teachers and the principal were convinced that information technology development should be enforced in Uganda. All agreed that information technology offers a gateway to the outside world never before experienced. However, while all of the students added comments that only reinforced their enthusiasm, some of the teachers and the principal, as will become clear below, recommended caution and gladly offered alternative ways of planning that could be communicated to Schools Online for any future projects.

Table 3: Percentage of Various Groups Researched

	Total	Interviewed	Percentage of Total
Students	300	33	11%
Teachers	12	12	100%
Principal	1	1	100%

As will become clear in the present dissertation, four out of twelve teachers interviewed as well as the principal expressed serious criticism on the school selection process and brought up the lack of appropriate planning in general by the donor organisation⁴⁸. This in turn could possibly lead to serious problems in the future according to these teachers. Half of the teachers mentioned some concern with regards to ongoing costs accompanying computers and the Internet, but remained very optimistic about the benefits of information technology. Two teachers were fully in favour of the project and denied any feelings of concern.

As was mentioned above, the information in this chapter is derived from informal interviews and meetings with beneficiaries of the project. However when every interviewee was asked the following direct question: "*Do you have any concern about the appropriateness of Schools Online having implemented this project in your school?*" the respondent was offered to answer either:

- "No concern"
- "Fairly Concerned"
- "Very Concerned"

A fairly extensive explanation of their replies would often follow.

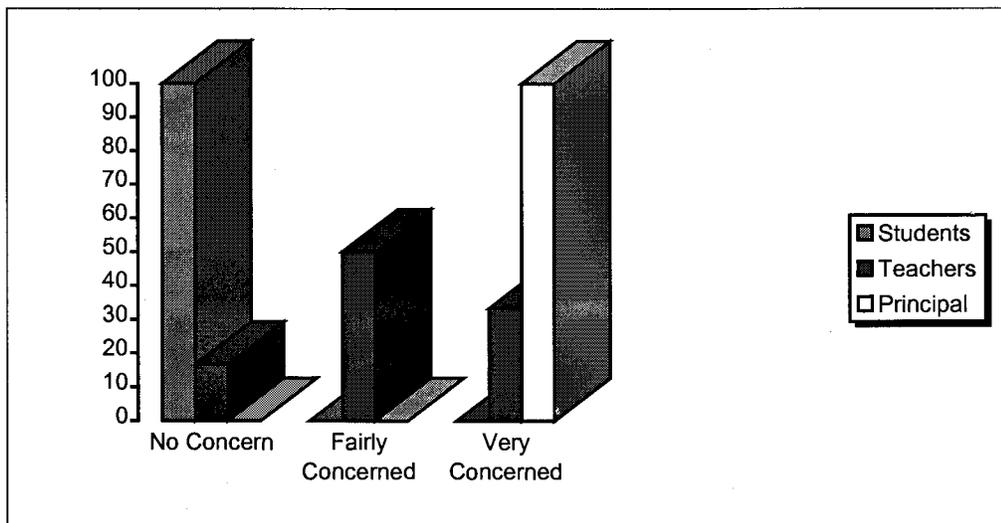
Table 4: Number of People Expressing Concern

	No Concern	Fairly Concerned	Very Concerned
Students	33		
Teachers	2	6	4
Principal			1

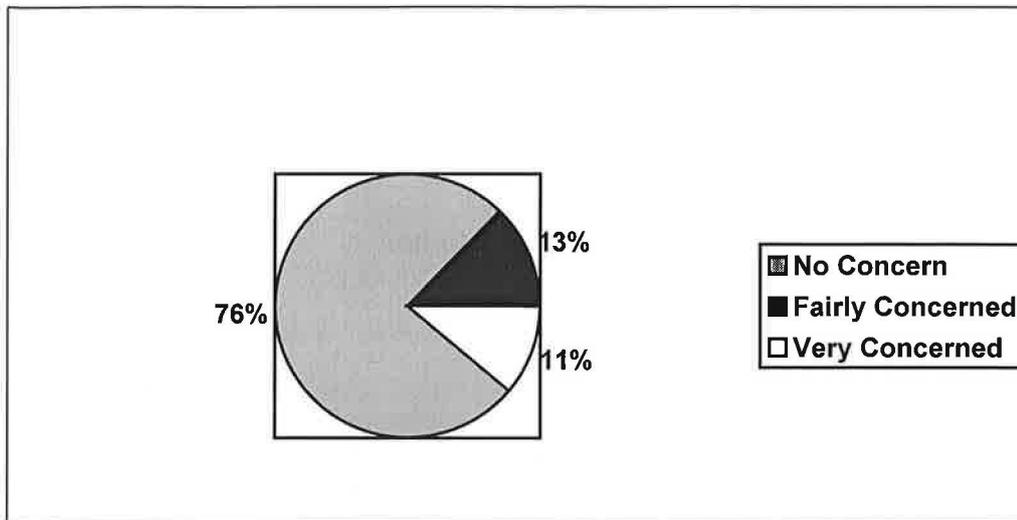
⁴⁸ Schools Online

Diagram 3 below emphasises the differences in concern. Where students did not worry about implementation by a United States-based organisation, the principal and a number of teachers were so concerned about sustaining the information technology project that they had organised town meetings to discuss the options of the school with the community at large.

Diagram 3: Comparative Level of Concern



Even though it seems reasonable to assume teachers and administrators will have more reservations about the effects a project has on the daily operations of a school, the ultimate success of a project also relies on the overall enthusiasm of its all participants irrespective of their positions. For Individuals compared irrespective of being student, teacher, or principal: See below Diagram 4.

Diagram 4: General Level of Concern

Typical conversations with students focused on the benefit of computers and the Internet and how communicating with the outside world was a new-found possibility since Schools Online's donation. There was neither concern about how computers came to the school nor how much the total cost of ownership was for the school.

One student described it as follows:

"[...] We loved the project. We didn't imagine we would be able to use the Internet at the school to get in contact with other kids. At first we were very excited and nervous because we have never surfed the net before and we felt we were going to get connected to a new world, but then we realised it is the same one." She added: "We are actually happy with our technology laboratory because it gave us the opportunity to work on projects. We say it again, we are really happy [...]"

Another student mentioned:

"[...] I am not concerned about Schools Online implementing this project. Thanks to this project we had the opportunity to work with other students and get to know them and how they live their adolescence [...]"

A student added the following:

"[...] We feel great because we were able to share feelings with other kids from different schools through technology and collaborative projects. This is very useful for us. Also we are proud of our school. We would like to continue participating in more projects [...]"

One student concluded:

"[...] We think the project was great because it allowed us to express ourselves freely, express good and bad things. We would like to continue surfing the Internet next year because it tells us about very interesting issues. And it is good for all of us to express what we feel. It is a unique experience, very enriching for us [...]"

Two teachers were very pleased with the course of the project and told the researcher that only a United States-based organisation would have funds and know-how to set up a computer laboratory connected to the Internet in rural Uganda.

One of them mentioned in a previous interview:

“[...] I am so proud of this school. I am happy to work in a school of the 21st Century. I only wish I had had the opportunities the students of today have in this school at their age [...]”

The second teacher agreed and praised Schools Online for offering such fast-speed connectivity through VSAT-technology. When asked if he was worried about the funds it would take to pay for ongoing connectivity costs, he replied that computer classes for a fee were becoming very popular in the community and that local businesses had already asked the school to make posters and pamphlets for a fee. I quote:

“[...] Schools Online brought us a window to the world; it is up to us to keep that window open [...]”

The principal and four of the teachers, on the other hand, were extremely critical. Even though they acknowledged the benefit of the Internet and computers, they insisted Schools Online had not included schools in the selection process nor was the school invited to plan the project with Schools Online. The principal mentioned her frustration that Schools Online had pre-determined what equipment would be needed at a specific school in Uganda. She complained that the school lacked space for a ten-computer laboratory and the added equipment took up a full classroom. She further said the school committee was forced to stop previously planned construction of a very needed⁴⁹ additional classroom since Internet connectivity bills were so high.

⁴⁹ Because of a growing number of students

One teacher's concerns about the ongoing costs focused on the communal African spirit. Arguing that Africans are social people, he stated:

"[...] We like to work in groups. There is no need for a personal computer per individual. A laboratory of ten computers is too much. It will demand too much funds to sustain all of them and there is not enough knowledge in the school about how to fix them, so we will need to take the computers all the way to Kampala when they break down [...] until there is a locally made computer we will struggle [...]"

Even though the interviewees were positive about the impact of the Internet in general and the benefits it offered, when teachers or students needed to do research for classes, one teacher asked what information available on the Internet was really crucial. She said:

"[...] Computers are fine. We do not need the Internet however. All the students need to learn is how to use Microsoft, so they can find jobs in Kampala [...] a 400 U.S. Dollars per month connectivity bill is just too high in our country [...]"

When asked for suggestions, one of the teachers mentioned that an initial donation of two to three computers without connectivity would have been a more appropriate start for the project. The principal echoed that this, at least, would have been considered if the school had been included in the planning phase.

Six teachers expressed strong mixed feelings about information technology deployment in their school by a United States-based organisation. These teachers were convinced that introducing the Internet and computers was beneficial and disagreed that ten computers plus periphery would drain their funds. However, all

six expressed slight concern about an organisation donating tools without involving the beneficiary.

As one teacher said:

"[...] Realities are different here [...] Schools Online should understand that if Internet connectivity becomes too expensive we do not need to pay for it. We can still use the computers and printers and keep working and teaching with computers [...] Internet is a great luxury, but we can do without it if the lack of funding does not allow us to continue [...]"

These six teachers saw the reasoning of the principal and very concerned teachers as valid. However, according to them the enthusiasm about information technology could not be tempered no matter who brought technology or who planned to bring it. They found themselves fairly concerned about the appropriateness of a Silicon Valley-based organisation steering their information technology development but found the benefits worth taking a risk. Fairly assured about a positive outcome, one teacher explained that the school could not enrol enough students since Internet connectivity was introduced. Children were coming from over ten kilometres away to join the school. Fees from these many extra students would eventually make up for the new ongoing costs the school had to endure, he explained.

4.4 CONCLUSION

It is worth noting that the administration of the school and teachers were concerned about the long-term financial implications high-end technology would have on their rural school. Students on the other hand, usually less occupied with

the financial running of the school and more concerned with daily life in the classroom, all enthusiastically expressed approval.

As was clear in the school in Jinja, for some people in Uganda the vision of Elahian is a dream come true. Finally having tools allowing communication with people across borders and continents is of tremendous value to students and some teachers who are not financially able to travel very far. Fast Internet connectivity in their community allows virtual travel. However, not everybody is as enthusiastic about the manner in which Schools Online attempts to wire the world "one school at a time".

Even though the critics among the beneficiaries acknowledge a need for information technology development, they argue for more appropriate ways of bringing technology tools to schools in Sub-Saharan Africa. A strong suggestion expressed at the school in Jinja was to involve the local people when deciding on what technology to bring and where to bring it.

CHAPTER 5

RECAPITULATION OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 RECAPITULATION OF FINDINGS

5.1.1 Chapter 1

There seems to be no stopping the recent spread of information technology in the developing world. The United States in particular is excited about the capacity information technologies could bring to the developing world.

During the 1960s, Americans predicted the spread of democracy and capitalism as the future for the rest of the world. Modernisation theorists predicted that the developing world would walk in the footsteps of more developed nations. As Webster (1984:49) states: "[...] Much of the interest in modernisation was prompted by the decline of the old colonial empires. The Third World became a focus of attention by politicians who were keen to show countries pushing for independence and that sustained development was possible under the Western wing." The information technology revolution and the thoughts associated with it bring back memories of modernisation theory.

As holds true in most development projects, there is bound to be a positive as well as a negative aspect to the introduction of the Internet in Sub-Saharan Africa. Many voices argue that the electronic revolution may be the force to narrow or even abolish the information gap by addressing the basic right to access information. Apart from obvious information available to a person able to access the Internet, the latter allows every individual to become a publisher. People voice opinions that could not be expressed before. For instance, in cyberspace Mugabe is publicly

criticised without repercussions and students in a school in Uganda are able to discuss political, social, and personal issues with students from various countries around the globe.

However, international development organisations have made huge blunders in the past because of a lack of understanding of local situations. Similar issues rise when steering information technology development in Sub-Saharan Africa from Silicon Valley.

5.1.2 Chapter 2

Silicon Valley is one of today's centres of information technology development. It is a wealthy area in Northern California determined to stay at the forefront of technological innovation.

Schools Online is a Silicon Valley-based organisation promoting information technology throughout the world. The organisation was born out of an entrepreneurial vision. A wealthy businessman from Silicon Valley had a dream to connect the world to the Internet 'one school at a time'. Success in business ventures gave him the courage and means to initiate Schools Online.

A board was formed, people were hired, and an organisation was started. Even though enthusiasm in Silicon Valley had gained serious momentum and donating technology seemed a necessary straightforward course to benefit communities around the globe, the staff of Schools Online suggested a more complex planning process. Schools Online documents reflect the complexity of steering information technology development in Sub-Saharan Africa. Staff at Schools Online appeared to have done a thorough job in expressing what it takes to wire the schools of the world. However, they lacked international development experience and even though

the organisation seemed legitimate in its vision on paper, its actions at the grassroots level would reflect an even more complex reality.

5.1.3 Chapter 3

“Development” is considered more than just economic progress. It also entails social, political, and technological advancement. Technological advancement for Schools Online means introduction of computers, periphery, and the Internet.

Located in the heart of Silicon Valley, Schools Online was part of a corporate philanthropy movement that did not question the benefit of bringing information technology to countries world-wide.

Schools Online initiated projects in many countries around the world as well as Sub-Saharan Africa. The reality of Sub-Saharan Africa, however, stands in stark contrast to life in the United States and Silicon Valley in particular.

First of all, harsh weather conditions in Africa are not computer friendly. Dust, heat, and sudden storms are a threat to the technology Schools Online wants to introduce. Secondly, even though most governments see the Internet as a tool that will assist the African renaissance, some fear the lack of control and they are reluctant to introduce new technologies that would allow for a fast spread of free information. Moreover, Africa’s material infrastructure is not well developed. Utilities that may seem necessities in the North are often considered luxury items in Sub-Saharan Africa. Telephone lines and electricity are not widely available to all Africans. Lastly, a lack of human capacity as well as very different cultural contexts suggests serious obstacles for information technology development to take place. Some voices of the South are convinced that this is another culturally insensitive ploy of Northern corporations to gain control and create more dependence.

5.1.4 Chapter 4

As mentioned above, the reality in Sub-Saharan Africa is distinct from the reality in the North. The case of Uganda is no different. The poverty level is extremely high and child mortality rates are excessive. Information technology politics are on the verge of liberalisation and the government is allowing free market forces to take control of telecommunications.

Even though, and possibly *because* the situation in Uganda is so different from Silicon Valley, Schools Online initiated a project there and suggested the Department of Education in Uganda select ten rural schools. VSAT-technology was brought in to bridge the telephony gap as well as to offer students and teachers faster connectivity.

Taking a closer look at a specific school "benefiting" from a Schools Online project, one notices most beneficiaries' enthusiasm. Their reactions tell us computers and Internet can, even in Uganda, be seen as beneficial. A majority indisputably sees information technology development as a necessity. The students in particular related how accessing the Internet had changed their lives. People more likely to be involved in ensuring the continuity of the project⁵⁰, on the other hand, expressed serious concerns about how information technology projects come about and could be sustained.

Even though most people seem to agree with the benefits of information technology, beneficiaries crucial to the sustainability of the project express strong doubts. They argue that planning and implementation of an information technology

⁵⁰ The school administration

project needs to respect local knowledge and understand the limited financial reality of a location.

5.2 CONCLUSIONS

The following conclusions can be made:

Silicon Valley is a wealthy area in the world with a large community of people convinced as to the benefits of information technology for everyone.

Schools Online as an organisation grew out of this enthusiasm and the vision of a Silicon Valley entrepreneur. It has a corporate board and a staff that acknowledges a lack of experience in international development. And even though Schools Online publishes documents and statements reflecting the complexity of donating information technology to communities in the South, it finds the most appropriate information technology solution a standard computer laboratory⁵¹ plus periphery and Internet connectivity. This reflects no flexibility when responding to the challenging divergent situations that are bound to be encountered when working in different cultural and social settings. It is not unusual for a development organisation such as Schools Online to publish documents on how planning processes are respectful of local input and how appropriate technology solutions are considered when in reality their projects prove to be very different. Treurnicht and Botha (1999:59) mention that even today development studies are dominated by Northern ideas and many organisations claiming to use participatory approaches are, in fact, still dictating future courses of action to their partners in the South.

⁵¹ See Appendix 1 for more detail

Sub-Saharan Africa experiences a very different reality compared to Silicon Valley. Uganda is a cultural, social, political, and technological world away from San Jose, California.

Uganda, as an example of a Sub-Saharan African country, struggles with poverty and development issues. Its Department of Communications has embraced the free market and hopes for a swift bridging of the digital divide.

Focusing on a rural school in Uganda selected by the Ugandan Department of Education to receive information technology from Schools Online, the researcher found enthusiasm from a majority of the researched beneficiaries to be high. Strong concerns, however, were expressed by the administration of the school as to the appropriateness of an outside organisation planning a project for a local school without prior consultation.

5.3 RECOMMENDATIONS

The following recommendations are made:

5.3.1 Recommendation 1

It is recommended Schools Online evaluate its projects while implementing them and allow the local voices of the beneficiaries to be heard during the planning stage.

Many development agencies have disregarded the true needs of the very people they are trying to reach. By doing so they lose track of how to appropriately respond to those needs.

Studying the school in Uganda made Schools Online seem to be another such organisation. Even though students were full of enthusiasm, administration of the researched school in Uganda expressed frustration with their lack of involvement in planning the project. The principal and a group of teachers mentioned, among other concerns, their fear of future financial strain after receiving such capital-intensive donations.

Rather than being what Chambers (1994a:1255-1257) describes as a "rushed development tourist", it is recommended that Schools Online listen and learn before it implements more projects. If the local situations and customs are not understood, Schools Online runs a great risk of destroying more than it claims to develop. By allowing more control to beneficiaries during the planning phase, Schools Online would be certain to respond to their actual needs in a more appropriate manner. As Ritchkin (1997:211) writes: "People-driven development has its origin in the concern that the people who are the beneficiaries of a project should have control over that project. People-driven development thus aims to build capacity in the process of implementing a project, rather than just delivering a product."

Schools Online could work with local beneficiaries in deciding what is needed and respond to those needs accordingly. As Treurnicht and Botha (1999:61) write: "The local people are regarded as professionals in their areas because they have co-evolved [...] with their social and ecological systems." This realisation does not, however, imply that any input from "outsiders"⁵² is unnecessary. Chambers (1983:75) explains: "Rural people's knowledge and modern scientific knowledge are

⁵² In this case: Schools Online

complementary in their strengths and weaknesses. Combined they may achieve what neither would alone.”

To quote Edwards (1989:126): “[...] We can not be relevant to people unless we understand their problems, and we can not understand these problems unless they tell us about them.”

5.3.2 Recommendation 2

It is recommended that Schools Online review its prescribed technological specifications to allow more flexibility in the implementation phase of a project.

Building on what is mentioned in *Recommendation 1*, the study recommends a more flexible information technology solution. Not every school in the world is able to absorb ten computers and an expensive Internet connection. Being a Silicon Valley-based organisation, Schools Online seems to assume it knows what information technology to bring to schools anywhere. Chambers (1983:76) writes: “From rich-country professionals in Third World countries right down to the lowliest extension workers, it is a common assumption that the modern scientific knowledge of the centre is sophisticated, advanced, and valid and, conversely, that whatever rural people may know will be unsystematic, imprecise, superficial, and often plain wrong.”

Schools Online should consider that local schools are able to come up with a more appropriate technology solution. This demands that Schools Online accept the fact that less than ten computers or even a totally different technology solution may be more helpful to people in Sub-Saharan Africa in certain cases. In turn, this

realisation may contribute to what Korten (1987:146) describes as the true goal of development: "Self-sustainability".

It may not be easy to, as Chambers (1994b: 1445) puts it, "hand over the stick". However, if Schools Online's vision is to reach students in under-resourced areas it is recommended they offer a more flexible technology solution.

5.3.3 Recommendation 3

It is recommended that Schools Online re-evaluate its board and hire people who have more experience in the international development sector.

All Schools Online board members are corporate people. Corporate people generally prefer fast and quantifiable results. A focus on and a respect of different cultural as well as social and political realities are considered a stumbling block for people craving speedy numeric results. Schools Online would benefit from adding board members who truly understand the complexities of the developing world.

The staff acknowledges a lack of experience in development work. It is advised that Schools Online hire people who have lived and worked in grassroots communities in Africa, Latin America, and Asia.

With a more diversified staff and board, Schools Online would be more effective and could initiate more quality projects as it might have a better understanding of the under-resourced communities it is trying to serve. Goulet (1985:27) writes: "If one understands that his technological superiority is but a relative benefit and that a man who is materially poor and technologically inferior may be humanly, aesthetically, and spiritually superior to him, he may feel compelled to question the

value priorities of his own society and contest the legitimacy of his own institutions.”

5.4 PROPOSED FIELDS OF STUDY

The following topics are proposed for further fields of study:

- The influence of corporations on the enthusiasm within the North to steer information technology projects in the South.
- Continued research in the specific school in Jinja once more time is allowed for the information technology to be absorbed in the school’s reality.
- Case studies of other schools in Uganda for a comparative study.
- A study of other information technology projects where the local voices were heard by the implementing agency for a comparative case study.

5.5 SYNTHESIS

There seems to be a substantial movement to distribute information technology in the developing world. Schools Online is part of this trend and has used this momentum. However, caution is advised when looking closely at the history, structure, and programmes of the organisation and comparing the context in which Schools Online was created to the realities of the communities it wants to serve.

APPENDIX 1

**Recommended
Internet Learning Centers (ILC) Model**



SCHOOLS ONLINE
connecting the world...one school at a time

Version 1.0
September 27, 2000

Recommended Internet Learning Centers (ILC) Model

Overview

The mission of Schools Online is to help ensure that all schools have effective access to the communications and information resources of the Internet. To achieve this goal, Schools Online has developed guidelines for cost-effective Internet Learning Centers (ILC) with reliable access to the Internet. In creating these guidelines, Schools Online considered various elements such as Internet connectivity, computer availability, acquisition costs, scalability, technical support, and educational tools.

School Infrastructure

Computer Specifications

An ILC is made up of a network of ten high-speed, Pentium-class computers with color monitors, two printers, a scanner and a digital still camera. Software included word processing, presentation, spreadsheet, antivirus, web publishing, and image editing applications.

Local Area Network

For the purpose of designing an efficient ILC, Schools Online suggests the workgroup network model. This model is the most efficient network for centers with less than 20 computers. The workgroup model allows all the computers to access the Internet and share files, folders and printers with a minimum of overhead and support. Using Microsoft Windows 98 with this model minimizes installation, downtime, training, and technical support.

Internet Access

Schools Online suggests a variety of ways to access the Internet, including dial-up, leased-line, and wireless. The Project Coordinator should create partnerships with a local Internet Service Provider (ISP) and local technology distributors to support reliable, and sustainable Internet access.

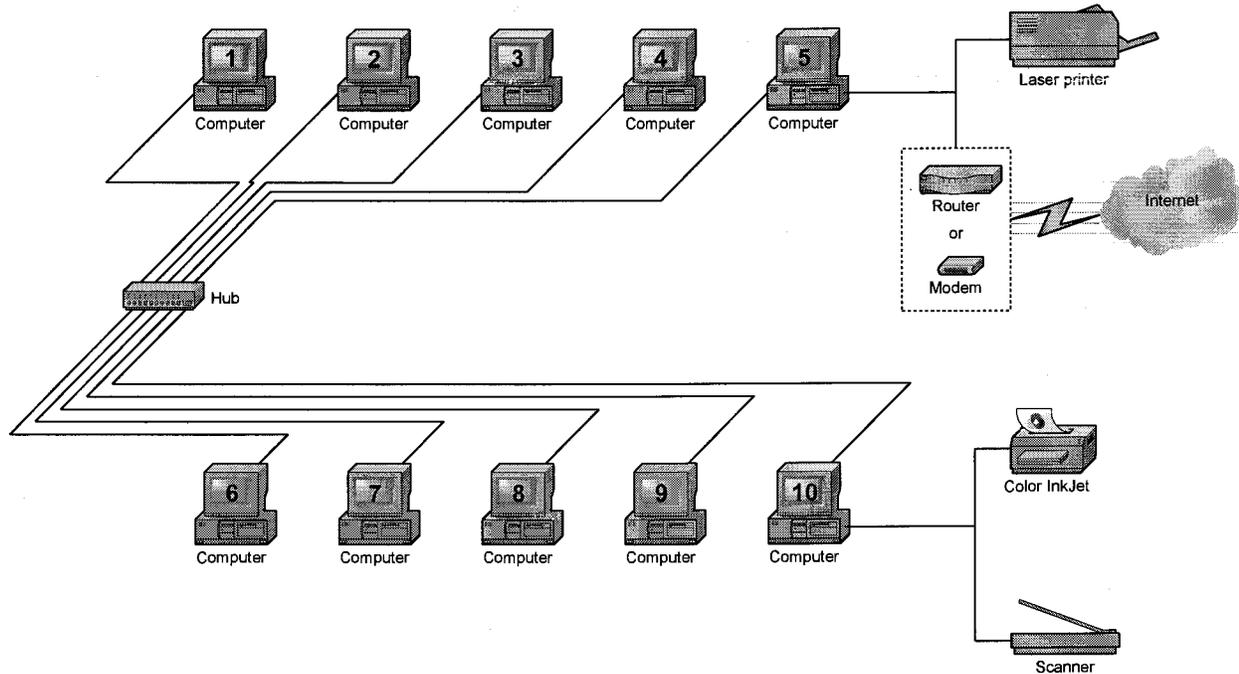
In locations where high bandwidth is available, leased-line access would be appropriate. Regions that are more rural, but maintain telephone lines should use dial-up access. Remote regions and areas without reliable telephone access should investigate the feasibility of wireless Internet access. Internet speed should be in the range from 28K to 128K. The Internet should be available for use during the school day for a minimum of eight hours.

Installation and Support

Schools Online will assist Project Coordinator with identifying Vendors selecting equipment, and reviewing bids. Computers acquired for the ILC should have a three-year warranty covering parts and labor. In addition to the standard three-year warranty on parts and labor, it is highly recommended to negotiate one year of onsite service.

Internet Learning Center (ILC) Model

Workgroup Network

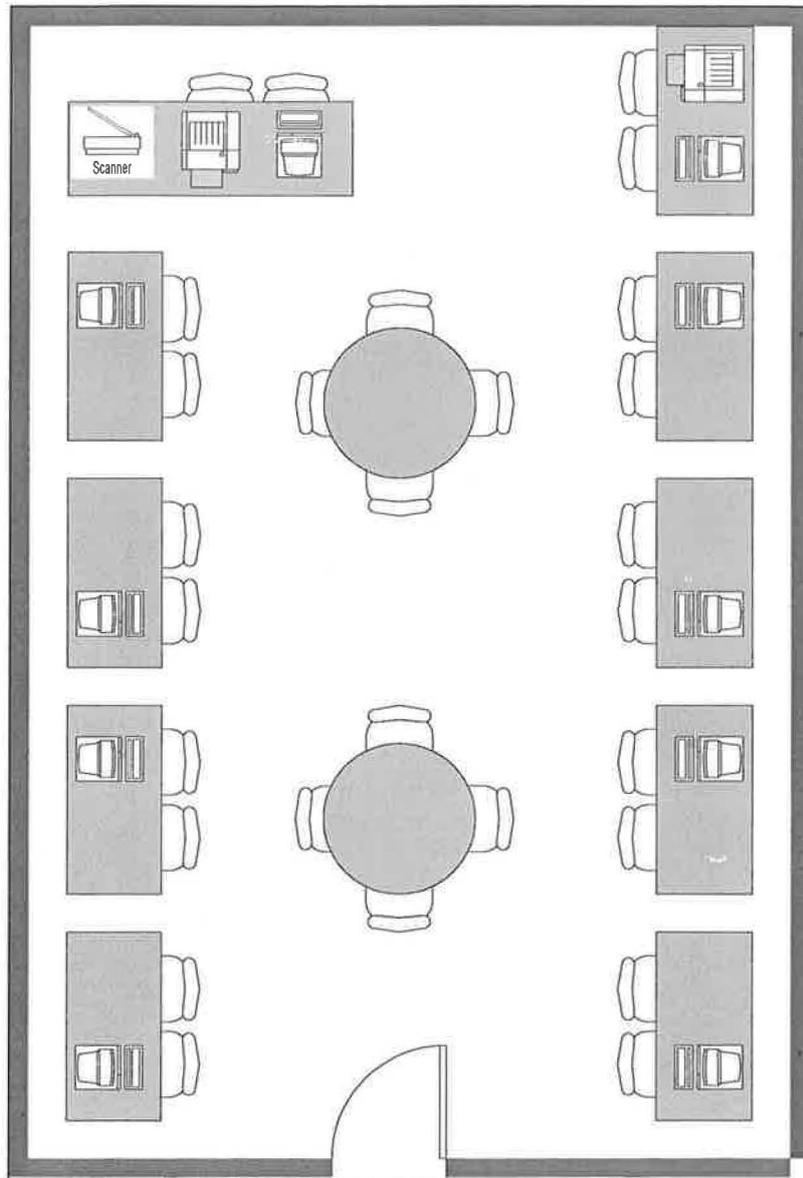


Notes:

Schools Online recommends a workgroup network configuration using ten high-speed computer workstations. All ten computers will run Microsoft Windows 98 operating system. There is no need for a dedicated computer as server. This is the most efficient network model for centers with less than 20 computers. This model requires minimal maintenance and support.

The workgroup network model can be expanded to a server-based network to support a larger number of computers by installing network operating system software such as Microsoft Windows NT. The decision to add a server at a later date should be based upon the needs of the students and teachers in the school supporting the ILC.

An Example Internet Learning Center (ILC) Arrangement



Suggested lab characteristics

Room dimension:	10 meters x 6 meters (30 feet x 20 feet)
Number of power outlets:	15
AC power condition:	Reliable without surge, irregularity and fluctuation
Room temperature:	20 degree C or below
Humidity:	As low as possible

Computer System

Approximate prices based in United States (\$US, September 2000)

		Price	Quantity
CPU	466 MHz, Intel Celeron or AMD K6-II	\$700	(x10)
Hard Drive	4.0 GB		
Memory	64 MB		
Video Card	SVGA, PCI or AGP, 4 MB		
Floppy Drive	3.5" 1.44 MB		
Mouse	PS/2 Compatible		
Keyboard	PS/2 Compatible		
CD-ROM	32x		
Network Card	Ethernet, 10/100Base-TX, PCI		
Mouse Pad	Mouse Pad		
Sound Card	32-bit		
Speakers and Microphone	2 Speakers, 1 Microphone		
Windows 98	Operating System, pre-installed		
Warranty and Service *	3-years Parts, Labor and 1-year On-site Service		

Peripherals

Monitor	SVGA, Color, 15"	\$150	(x10)
Printer 1 (Inkjet)	Inkjet, Black and Color, 4 PPM Black	\$100	(x1)
Printer 2 (Laser)	Laser, Black, 6 PPM	\$400	(x1)
Printer Cable	Parallel	\$10	(x2)
Hub	Ethernet, 10Base-T, 12-port	\$100	(x1)
Network Cable	Ethernet, RJ-45, Cat 5, Cabling Labor	\$200	(x1)
Power Strip/Surge	Standard, 4-outlet with Surge Protection	\$10	(x10)
Scanner	Flatbed, Color, 600 dpi optical resolution	\$100	(x1)
Digital Camera	1 Megapixel, 1024 pixel resolution	\$400	(x1)
Power Supply	UPS, 400 VA, Phone line conditioner, if needed	\$250	
Diskette	1.44 MB, 100-pack	\$50	(x1)

Internet Access Solution

(Choose one that applies)

Modem	56Kbps, Internal or External	\$100	(x1)
Router and DSU/CSU	Small-sized (per connection) with DSU/CSU	\$1600	(x1)
ISDN Access Router	Standard, Country specific	\$600	(x1)
Wireless	Standard, Country specific	varies	

Software

Operating System	Windows 98 Second Edition	Pre-installed
Internet Browser	Microsoft Internet Explorer Netscape Communicator	Free Pre-installed
Multimedia	Apple QuickTime Microsoft Media Player RealNetwork RealPlayer Basic	Free
Productivity Suite (choose one)	Sun StarOffice (free) Microsoft Office Corel WordPerfect Office Lotus SmartSuite Millennium	\$500 or Free 1 CD and 10 licenses Educational Pricing
Web and Image Authoring	Netscape Composer (included in Communicator) Imaging software included in the scanner	Free
Tools and Utilities	Winzip (shareware) Adobe Acrobat Reader	Free
Antivirus (choose one)	Trend Micro PC-Cillin McAfee VirusScan Norton AntiVirus	\$200 or Free 1 CD and 10 licenses Educational Pricing
Proxy software	Ositis WinProxy	\$150 1 CD and 10 licenses Educational Pricing

*See details on Technical Proposal Document

BIBLIOGRAPHY

Amin, S. 1996. *A propos de l'ideologie dominante de notre époque. La communication comme ideologie*. Paper presented at a seminar on "la rencontre de L'Afrique et les Nouvelles Technologies de l'Information", UNDP offices Geneva, Switzerland.

Broos, J. 2002. Personal communication. 27 June. San Jose.

Chambers, R. 1983. *Rural Development: Putting the Last First*, Essex: Longman Scientific & Technical.

Chambers, R. 1994a. Participatory Rural Appraisal (PRA): Analysis of experience. *World Development* 22 (9).

Chambers, R. 1994b. Participatory Rural Appraisal (PRA): Challenges, Potentials and Paradigm. *World Development* 22 (10).

Chen, MA. 1995. The feminization of poverty, in *A Commitment to the World's Women: Perspectives on Development for Beijing and Beyond*, edited by N. Heyzer, S Kapoor and J Sandler. New York: United Nations Fund for Women.

Collins, K. 1999. *Participatory Research A primer*. South Africa: Prentice Hall (Pty) Ltd.

Edwards, M. 1989. The irrelevance of development studies. *Third World Quarterly* Vol.11 no.1.

Elahian, K. 2002. Personal communication. 10 January. Palo Alto.

Gittinger, JP, Chernick, S, Horenstein, NR & Saito, K. 1990. *Household Food Security and the Role of Women*. Washington, DC: World Bank.

Gouldlee, F. Horton, R. & Smith, R. 2000. Global Information Flow. *The Lancet* vol. 356.

Goulet, D. 1985. *The Cruel Choice*. New York: University Press of America.

Hilliard, R. 2002. Getting ready for Cyberspace, in *Beyond Boundaries Cyberspace in Africa*, edited by Melinda B Robins and Robert L. Hilliard. Portsmouth: Heinemann.

Katz, J. 1998. The Netizen: Birth of a Digital Nation, in *Composing Cyberspace: Identity, community and Knowledge in the electronic age*, edited by R. Holeton. San Francisco: McGraw-Hill Companies, Inc.

Korten, D. 1987. Third Generation NGO Strategies: A Key to People-centred Development, *World Development*, 15, (Supplement).

Korten, D. 1990. *Getting to the 21st Century: Voluntary Action and the Global Agenda*. West Hartford: Kumarian.

Korten, D. 1995. *When Corporations Rule the World*. San Francisco: Berrett-Koehler Publishers, Inc.

Korten, D. 1998. *Globalizing Civil Society; Reclaiming our Right to Power*. New York: Seven Stories Press.

Kotze, D A. 1983. *Development policies and approaches in Southern Africa*. Cape Town: Academia.

Marx, K. 1976. *Capital: a critique of political economy*, vol. 1. Harmondsworth: Pinguin.

Morgan, G. 1998. *Images of Organisation*, San Francisco: Berrett-Koehler, Inc. and Sage Publications.

Mouton, J. 1996. *Understanding social research*. Hatfield, Pretoria: Van Shaik Publishers.

Neill, M. 1998. Computers, thinking and schools in the "New World Economic Order", in *Composing Cyberspace; Identity, community and Knowledge in the electronic age*, edited by R. Holeton. San Francisco: McGraw-Hill Companies, Inc.

Newman, C. 2001. Silicon Valley; Inside the dream incubator. *National Geographic* December 2001.

Mulenga, D. 1994 *Inform the margins: challenges, possibilities and limitations of participatory research. Summer school in participatory research*. Umtata, South Africa: Human Sciences Research Council.

O'Connor, RJ. 1998. Africa: The unwired continent, in *Composing Cyberspace; Identity, community and Knowledge in the electronic age*, edited by R. Holeton. San Francisco: McGraw-Hill Companies, Inc.

Rahimi, T. 2002. Personal communication. 8th February, San Jose.

Ritchken, E. 1997, Chapter 8; *Managing Sustainable Development in South Africa*, edited by P. Fitzgerald, A. Mc Lennon, B Munslow. Cape Town: Oxford University Press.

Robins, M. & Hilliard, R. 2002. Preface, in *Beyond Boundaries Cyberspace in Africa*, edited by Melinda B Robins and Robert L. Hilliard. Portsmouth: Heinemann.

Shah, V. 2002. Personal communication. 18 June, San Jose.

Spencer, D. 1998. Gender Bending, in *Composing Cyberspace; Identity, community and Knowledge in the electronic age*, edited by R. Holeton. San Francisco: McGraw-Hill Companies, Inc.

Toumani, M. 2002. Personal communication. 18 June, San Jose.

Treurnicht, S. & Botha, N., 1999. Participatory Learning and Action: Challenges for South Africa, *Africanus: Journal of development Administration* 29 (1).

Webster, A. 1984. *Introduction to the sociology of development*. London: Macmillan.

Winner, L. 1998. Myth information, in *Composing Cyberspace; Identity, community and Knowledge in the electronic age*, edited by R. Holeyton. San Francisco: McGraw-Hill Companies, Inc.

Yocam, K. 2002. Personal communication. 18 July, Palo Alto.

Zeledon, R. 2002. Personal communication. 11 February, San Jose.

ONLINE SOURCES

"AISI-Connect National ICT Profile UGANDA (UG)" 13 September 2002
http://www2.sn.apc.org/africa/countdet.CFM?countries_ISO_Code=UG

"Schools Online Country List." 17 January 2002.
<http://www.schoolsonline.org/whatwedo/countries.htm>

"Schools Online in Uganda" 19 September 2002
<http://www.schoolsonline.org/whatwedo/uganda.htm>

"Schools Online Mission" 17 January 2002
<http://www.schoolsonline.org/whoweare/mission.htm>

"Schools Online Mission" 1 September 2002
<http://www.schoolsonline.org/whoweare/mission.htm>

"Schools Online Programs" 1 September 2002
<http://www.schoolsonline.org/whatwedo/index.htm>

"Schools Online Staff" 1 September 2002
<http://www.schoolsonline.org/whoweare/staff.htm#touraj>

"Schools Online Staff" 1 September 2002
<http://www.schoolsonline.org/whoweare/staff.htm#jbroos>

"Schools Online Staff" 1 September 2002
<http://www.schoolsonline.org/whoweare/staff.htm#rolando>

"Schools Online Staff" 1 September 2002
<http://www.schoolsonline.org/whoweare/staff.htm#monica>

"Schools Online Staff" 1 September 2002
<http://www.schoolsonline.org/whoweare/staff.htm#valeri>