Evaluation of the Effectiveness of the Information Technology Centers in the Mae Moh District of Thailand

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Abstract

This project assessed Information Technology (IT) Centers in four villages in the Mae Moh District of northern Thailand. We lived in these villages for four weeks conducting surveys and interviews to examine the accessibility and sustainability of each center. We establish criteria to evaluate these centers and made recommendations for improvements in each one. Our methods of analysis could be used elsewhere to study the impact of IT Centers on the digital divide.

Executive Summary

In northern Thailand in Lampang Province is Amphoe (district) Mae Moh. Mae Moh contains several villages, each of which is unique. In the past year, our Project sponsor, Dr. Nuntavarn Vichit-Vadakan has worked with the amphoe and village leaders to plan and implement Information Technology (IT) Centers in the villages of Hang Hung, Na Kam, Hua Fai, and Huay King.

The purpose of these IT Centers is to help bridge the digital divide that exists between Thais who live in cities which offer regular access to information and technology and Thais who live in such villages which do not. The IT Centers received funding from various sources such as the Electricity Generating Authority of Thailand (EGAT), the America Corporation of Thailand (ACT), the Canadian International development Agency (CIDA) and World Bank. This funding was used to purchase equipment for the centers and to get them started. Currently, all of the centers' expenses are being paid by these grants. When this grant money runs out, the centers will have to be financially sustainable to stay in operation.

Dr. Nuntavarn asked us to assist in an evaluation of the IT Centers. The major goals of this project were to assess the accessibility of the IT centers to the villagers, assess the sustainability of the IT centers once the initial funding is used, and to generate an evaluation method to assess the centers in the future.

Our first step in accomplishing our goals was to conduct extensive background research. We consulted reports of previous projects conducted in Amphoe Mae Moh for details about the area and many factors that influenced the villages. We also researched studies of the digital divide and other IT Centers around the world. The archives of the Bangkok Post also served as an excellent resource of information regarding the politics and local activism surrounding recent events that have taken place in Mae Moh.

One of the many characteristics that we discovered in this research was that Mae Moh is home to power plants that collectively provide nearly a quarter of Thailand's electricity and a massive lignite mine. Both the mining and the power plants have greatly affected the environment in the area and many people's way of life. On the same note, the Energy Generating Authority of Thailand (EGAT) has taken part in many projects to improve the quality of life in

the villages. To name a few, EGAT has helped build schools, a hospital, and most recently, IT Centers.

We visited Mae Moh for a total of four weeks to conduct our study. We spent approximately one week in each of the four villages to study each IT Center. Our project consisted of three activities that helped us achieve our goals. The first activity was to interview the stakeholders in the center to determine what they have done to ensure the center is accessible and sustainable. The second was to survey the users and nonusers of the IT Center in the village to determine if the center is accessible and usable for them. The third and final activity was to combine the results of the interviews and surveys with the information in each center's log and our own observations to assess the accessibility and sustainability of each center.

We conducted evaluations in each of the four villages. Upon arriving in each village, we made arrangements to interview the village head, the IT Center operator, the IT Center committee, and if possible, other representatives of groups in the village with an interest in the IT Center. During our stay, we also conducted the survey. We had every user of the IT center fill out a survey. We also walked around the village and asked random villagers to fill out the survey. This gave us a general idea of what some other people in the village thought about the IT Center, but it was not necessarily representative of the whole village. Starting with the second village, we decided to survey the oldest class of children in the primary school in each village in order to get more student respondents. We also observed the centers over the course of each week. We observed who used the centers, and when we they used them. We also observed how people used the centers. We supported our observations with the IT Center logs which give details about the users of the centers and what is used the most in each center.

At the end of our stay in each village, after we had conducted all of the interviews and collected all of the surveys and briefly reviewed them, we made changes to the interview questions, the survey questions, and the survey format. We found it necessary to do this because in many cases words were not properly translated or did not have a simple translation into Thai. We recognized these problems from the answers we received and the facial expressions we observed while conducting interviews and surveys. Each week, we made a new revision of the interview questions and the survey so that by the end of the fourth week, we were able to conduct both with little or no confusion.

We documented the final survey and interview, and our method of administering each. This methodology can now be easily reproduced in the future to determine if the centers are sustainable and accessible, or it could also be used in analyzing other IT Centers in Thailand or elsewhere around the world.

We began our analysis using results from the interviews and surveys, combined with our own observations and the IT Center logs to assess the accessibility and sustainability of each of the centers. We came to certain conclusions about each center, and then we made some recommendations that could be used to improve some or all of the centers.

The IT Center in Hang Hung is very well used and the villagers are quite excited about the center. The current use of the center is sufficient to sustain the center. The center is affordable for most or all of the villagers, but many people do not use the centers because they lack the education to use the centers. Also, we found that often, all of the computers were occupied using games, which prevented other villagers from using them to access the Internet.

Na Kam is much larger and much more urban than the other villages. The village also contains two well-equipped Internet Cafes that compete with the IT Center. In addition, there are some villagers who have not only computers, but also Internet access in their home. All of these factors led to the IT Center very little use. At the time of our project, the center was not sustainable. If the center was promoted and training was available, the IT Center would see more use and the body of users would grow. This would possibly make the IT Center sustainable.

Hua Fai is in a remote location compared to all of the other villages in Mae Moh. For this reason the phone line and therefore Internet connection is of very low quality. The village is also very rural. There are very few computers in the villages and no Internet access. The center is still sustainable without Internet access; however, this means that the center fails in its mission to connect the village to the outside world.

Huay King's IT Center is located in the primary school. This allows the students in the school, as well as all of the children who use the school's athletic fields in the evenings and weekends, to access the centers very easily. At the time of our project, the center was sustainable. As in all of the villages, the centers are affordable for everyone, but many villagers lack the training to use the centers effectively.

In each village we found that many villagers lacked the knowledge of how to use computers and the Internet. In order for the centers to be truly accessible, all of the villagers should be able to use them. We recommended that training in computer and Internet use be made available to all interested villagers. In addition, we also recommended a few methods to increase the amount of time spent in the center, as well as to increase the number of users. We also made some recommendations about purchasing additional equipment that would be helpful for the centers' sustainability.

If our recommended improvements are made, the IT Centers of Mae Moh District can be both accessible to everyone in the villages as well as self-sustainable for many years. The centers are a positive addition to each of the villages, and will help to close the digital divide that exists between the cities and rural areas of Thailand.

Authorship

This report is the combined work of all of the members of the IQP team. Through the entire term, all four of us have put significant effort into all of the sections.

The Abstract and Executive summary were written and revised by Joseph. All of the members of the team revised the section based heavily on comments from our advisors.

The introduction was written by Hema. It was then revised by Eduardo and Joseph, before it was finally revised by Hema. The background was jointly written by all four members. All of the members added small portions to the section. Hema added several major parts based on information we learned during our fieldwork. Hema and Joseph both reviewed and revised the section.

The methodology was originally broken up and written by all four members, but was then completely rewritten twice by Joseph. He also revised it based on the team's input. Joseph rewrote the section again after conducting the study. It was then revised and rewritten by Jesse. Finally, Hema and Joseph reviewed the section

The results section was outlined by Jesse and then completed by Hema. Eduardo added several graphs to the section, all of which were corrected by Hema. Jesse and Eduardo both revised the section by incorporating our advisor's input. Hema and Joseph then proofread the entire section. The analysis chapter was started by Hema and completed by Joseph. Joseph added sections about the value-weighted analysis, which were then expanded by Jesse. Hema and Joseph then proofread the entire section.

The Lessons Learned section was written by Jesse with the input of the whole group. The Lessons Learned section was later revised by Jesse. The section was revised by Joseph and Hema.

The conclusions and recommendations section was written by Eduardo and was rewritten by Joseph. The chapter was later revised and edited by Jesse. Hema and edited and proofread the section.

Hema and Joseph worked together to write all of the appendices. Hema and Joseph both proofread the sections as well.

1. Introduction

Different countries have different levels of technology. A few middle-level economic countries like Taiwan, Brazil and South Korea may manage to catch up with countries like the United States and Australia by with software development or silicon manufacturing industries, but the poor countries, plagued by multiple burdens of debt, may join the digital world decades later and, in the long-term, may ultimately fail to catch up. Many developing countries could be condemned to economic stagnation because of a lack of investment in high-technology infrastructure. Countries such as China, Russia, Indonesia, Pakistan, Thailand, and South Africa are not yet prepared to catch up with the computer revolution.[1]

Many official agencies have expressed concern about the development of technology within societies. Technological opportunities are often highly unevenly distributed, even in nations like Australia, the United States and Sweden. As the Internet becomes increasingly central to our daily life and work, by providing job opportunities, strengthening community networks, and facilitating educational advancement, it can become a problem if certain groups are systematically excluded, such as poorer neighborhoods, working class households, or peripheral rural communities. Governments in many countries such as Thailand have recognized this issue and have developed initiatives designed to tackle this potential problem.

Unequal access to information and technology in a sector of a community is directly connected to social, economical, and educational implications. This issue created by the computer revolution is increasingly being described by the term "digital divide."

The focus of our project is the villages of Mae Moh District in Northern Thailand. Four Information Technology (IT) centers in four villages of the Mae Moh District have been constructed with funding from both government and private organizations. The main intention in creating these centers was to help bridge the digital divide that exists between more affluent cities such as Chiang Mai and Bangkok and rural village communities such as those in the Mae Moh District. The goals of this project were to determine how well these centers would reduce the digital divide by evaluating the sustainability and accessibility of the IT Centers of Mae Moh District, and to create an effective system of evaluation that can be used again in the future.

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[1] "The Losers of the Digital Divide" http://news.bbc.co.uk/hi/english/business/newsid_891000/891999.stm

The following chapters are organized as follows. The background chapter contains information and case studies on global digital divide, geographic and demographic information of the Mae Moh District and the villages as well as information on the purpose and funding of the centers and its stakeholders. The methodology chapter specifies our primary objectives and details how we achieved them. The results chapter presents all of the information that we collected through surveys and interviews. The analysis chapter takes the results and interprets them both by village comparisons and a weighted value analysis for each IT center. The conclusions and recommendations chapter highlights steps that may be taken to enhance each of the four centers as well as the programs of the IT center as a whole. We will also reflect on the lessons learn from the team experience living with families in the villages of Mae Moh.

2. Background

In order to study Information Technology (IT) Centers and their effects on bridging the digital divide, we have conducted extensive background research on a variety of related topics. This chapter contains information about the digital divide, presents some case studies, describes the villages in which we worked, introduces the key people and agencies involved in the planning, construction, and maintenance of the IT Centers, and finally provides details about the centers themselves.

2.1 The Digital Divide

A large focus of this project will be the digital divide. The United States' National Telecommunications and Information Administration (NTIA) describes the digital divide in these terms:

> In just about every country, some percentage of people has the best information technology that society has to offer. These people have the most powerful computers, the best telephone service and fastest Internet service, as well as a wealth of content and training relevant to their lives. There is another group of people. They are the people who for one reason or another don't have access to the newest or best computers, the most reliable telephone service or the fastest or most convenient Internet services. The difference between these two groups of people is what has been called the "digital divide."[2]

The digital divide is simply a modern manifestation of the social, economic, and educational differences among people within an area. But while access to computers and the Internet also has the ability to raise one's social, economic, and educational standing, access to computers and the Internet is easier and more common among members of the upper classes of society. Thus it is difficult to break the cycle in which uneven access to technology (the digital divide) is a major contributing factor to the widening of the digital divide.

2.1.1 The Digital Divide on a Global Scale

The digital divide exists on a global scale between countries as well as within each country. In Latin America, for example, the digital divide was measured by using the size of the "Technology Elite" in each country. The technology elite is the part of the population that has

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[2] www.digitaldivide.gov

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easy access to a variety of technologies, including television, radio, video game systems, computers, and Internet connections. In affluent South American nations such as Brazil and Argentina, fifteen and eleven percent of those surveyed were within the technology elite, while poorer countries in Latin America had a technological elite as low as two to four percent of the population.[3]

Differing technology levels in different countries are usually a result of the governments' stability and priorities. In the near future, however, a lack of technology will severely impact a nation's competitiveness on an international level. This is the driving force behind many countries' attempts to improve access to technology and information for their citizens.[4]

Several studies of the digital divide have already been undertaken all over the world. These studies allowed allow us to assess different methods of studying the digital divide, identify our own method of study, and to anticipate the kinds of results we might expect.

2.1.1.1   The Digital Divide in the United States

In the past, the United States has been adamant that reliable communication be available to all of its citizens. The Articles of the Confederation, which preceded the constitution, organized a federal government with no taxes, no armed forces, but with a postal service. Our current constitution still mandates the existence of the post office, and postage remains the same for all Americans regardless of their social status, neighborhood, or distance from the post office.[5] In 1934, the Federal Communications Commission (FCC) was formed to govern communications media, namely telephone systems and radio frequencies. The communications act of 1934 that created the FCC also mandated that telephone access be made available in even the most remote areas. Nevertheless, access to new technologies has been unevenly distributed in the United States since there are still Americans without telephone access.

In early 2001, the Gartner Group published a study on the digital divide in the United States. They found that Internet access was strongly correlated to socio-economic class. In fact,

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[3] *Los Medios y Mercados de Latinoamérica*
[4] www.DigitalDivideNetwork.net
[5] Overcoming the Digital Divide, p.2

the use of certain websites, such as visiting government websites for information, was even more strongly correlated to higher socioeconomic class.[6]

The federal government has only attempted to solve the problem financially. The National Telecommunications and Information Administration has given out millions of dollars in the form of grants to help municipalities provide Internet resources. Many schools and libraries have received similar grants from other government and private organizations to provide Internet access and content.

2.1.1.2 The Digital Divide in Worcester, Massachusetts

In the past year, a group of students from Worcester Polytechnic Institute (WPI) conducted research on the digital divide in the city of Worcester. This research team concluded that there is a digital divide in Worcester that falls along racial and socio-economic boundaries; Caucasians and the wealthy have more access to technology than poor people or Latinos and African-Americans.

What we found interesting about that project was not its results so much as its methodology. That project group devised a method to measure the digital divide with a survey. Respondents were asked to indicate which technological items they either used or had access to. These surveys were each given a score according to the number of items indicated by the respondent. For example, if a respondent indicated use of TV and telephone, that person would receive a score of 2. The results were plotted on a scatter plot, which resulted in several clearly defined groups. These groups were also confirmed by statistical methods. One group had extremely high scores, indicating use of a variety of technologies. A second group, with scores scattered across the middle range, lagged significantly behind the first group. Finally, a small group with extremely low scores was separated from the rest. In addition to using this scatter plot, the project team also assessed the severity of the digital divide based on the size of the high-scoring group, and the magnitude of the separation of that group from the average of the whole.

2.1.1.3 Case study in the United States: Morristown High School Media Center

Public libraries and media centers have made the Internet available to many people in the United States. The Internet is relatively new, and Internet access has only been introduced in most libraries in the past five years.

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[6] Government and the Digital Divide, p.8

The process of introducing Internet access to libraries in the US may have some similarities to the same process in IT centers of Thailand. Morristown High School (MHS) in Morristown, NJ, is the only high school in the Morris School District. Four years ago, the Library/Media Center unveiled 16 new computers with Internet access. While the IT centers have a broad audience, the MHS Media Center was designed specifically for high school classes to use for research, as well as individual research. The number of computers was chosen based on the availability of free space and so that only two students would have to share a computer in most classes.

The original plan was to train students to use the Internet for research as part of the classes that required research. This meant that entire classes would come to the media center during class time, and get group instruction on how to use the Internet to complement traditional research resources. In many cases, some students were already familiar with the Internet, while others were completely new to it. In all cases, however, it was and still is necessary to educate students about determining the academic reliability of the Internet sources found in their research. While the MHS media center has been successful and productive, the director, Hilda Weisburg, indicates that students would be best served if there was an entire course dedicated to Internet research methods and evaluating the reliability of online resources. In the past four years, Internet access in the media center changed from one of many resources to the primary resource for many students.[7]

While the MHS media center is quite different from an IT center in Mae Moh, the plan for training Internet users gives a different perspective when analyzing the training provided at the IT centers. In addition, the fact that Internet access has become the primary use of the media center attests to the importance and usefulness of the Internet as an educational resource.

2.1.1.4 The Digital Divide in Australia

The Rural Industries Research and Development Corporation (RIRDC) of the Australian government have done significant research on the impact of technology and the Internet on rural areas of Australia. The majority of their studies involve the impact of computers and the Internet on the success of rural businesses and farms. In nearly every case, the corporation has found that technology gives an advantage over those without it. With the Internet, farmers have immediate

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[7] Interview with Hilda Weisburg

access to weather information, as well a method of communicating about everything from the demand for different crops to the value of certain farming techniques and equipment.[8]

2.1.2   Evaluating the Digital Divide

In order to measure the extent of the digital divide in a particular geographic area, one must determine the difference in access to digital technology and information, as well as the difference in knowledge of how to use these resources. It is very possible that a group of people may have access to a variety of technologies, but not have sufficient training to use them effectively. The digital divide alone is not necessarily responsible for the difference in access and knowledge. An imbalanced social and economic state with very small and very wealthy upper classes and very large and extremely poor lower classes has problems that existed prior to the existence of the digital divide. Technology and education could be applied either to widen or to shrink the socio-economic gap.[9]

Both the study of Latin America and the WPI project in Worcester used surveys to measure the digital divide. These surveys asked residents of a particular community what types of technology they had in their homes, as well as what types of technology they had access to on a regular basis. Each survey was given a score, which represented that person's technology status. Statistical analysis in each case indicated the existence of a "technology elite", usually comprising less than ten percent of the population.[10] We chose not to use this method of analysis because our primary concern was not measuring the digital divide, but instead evaluating the centers based on sustainability and accessibility.

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[8] Simpson, p 4
[9] Simpson, p 32
[10] *Los Medios y Mercados de Latinoamérica*

2.2 Mae Moh District

The team worked in four villages of the Mae Moh District of Lampang Province in Northern Thailand to evaluate new Information Technology (IT) Centers.

The Northern Region of Thailand, an area of 170,000 square kilometers, is between Laos and Myanmar and contains seventeen provinces. Northern Thailand is a mountainous region comprising natural forests, ridges and deep, narrow valleys.[11]

The Lampang Province has almost 800,000 residents. Even though the population growth is steady, there has been a rise of 49,000 residents since 1987. The average population density of the province is about 62 persons per square kilometer, with the center of Lampang, Mae Tha, Koh Kha, Thoen and Ngao being the most crowded areas. In 1993, Lampang had 478,481 persons of employable age, that is, 61% of the population. Lampang's unemployment rate is only 3.3%.[12]

Figure 1: Map of Thailand by Region

Figure 2: 17 Provinces of Northern Thailand

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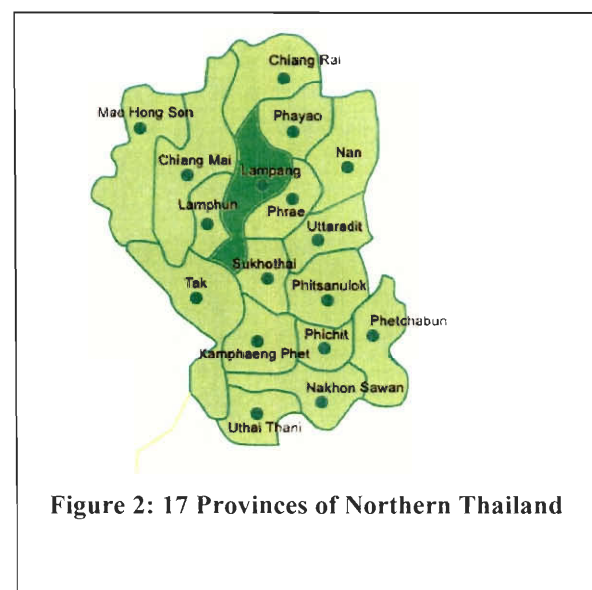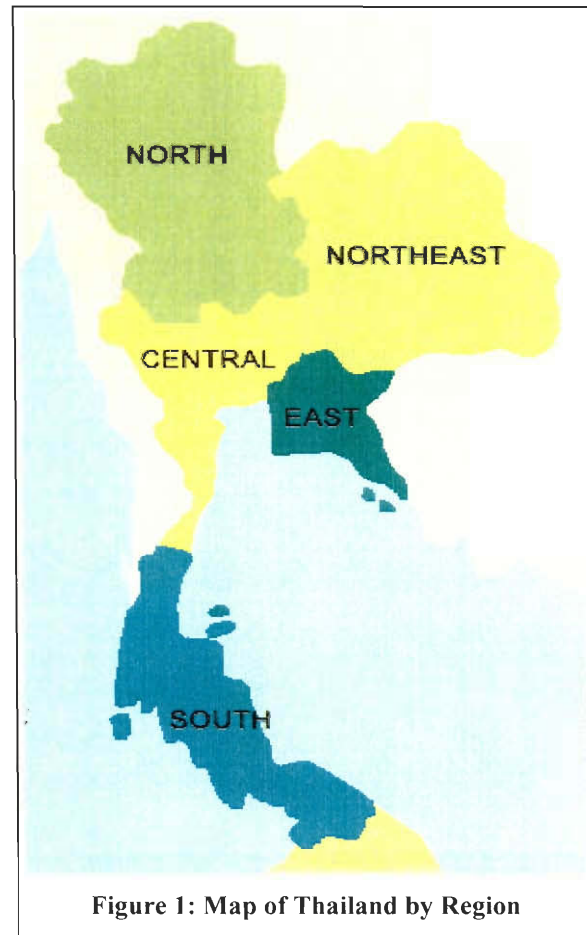
[11] "Lampang" http://thai.sawadee.com/north/lampang/ 11/10/01.
[12] "Lampang Data Base." http://52000.hypermart.net/main/english.htm 11/17/01

The Lampang educational system provides for a complete education from kindergarten through university with quality institutions at every level. The province has more than 500 primary and secondary schools, five public and fifteen vocational schools. It also has colleges of agriculture, nursing, teaching and physical education as well as Yonok College, a private higher education institution.[13]

Amphoe[14] (district) Mae Moh is located to the east of the center of Lampang Province shown in Figure 2. Mae Moh is approximately 350 miles north of Bangkok.[15]

Amphoe Mae Moh is divided into four tambons[16] surrounding a lignite power plant and mining area: Ban Dong to the north, Na Sak to the east, Sobpath at the south, and Mae Moh at southwest.

Map of Amphoe Mae Moh
Source: Mae Moh Project Team, Chulalongkorn University

Figure 3: Map of Amphoe Mae Moh

Figure 3 shows the tambons of Mae Moh District. The IT centers are located in Hua King, Hang Hung, Na Kam, and Hua Fai. Each of the four villages has their own elementary school, which covers up to the equivalent of US grade 6. Mae Moh Witaya (MMW) is the high school for all of the villages, and covers the equivalent of US grades 7 through 12. Four teachers from MMW received 7 days of training in Bangkok on how to teach students to use computers and the Internet before the opening of the centers. MMW now has a very intense computer curriculum that covers programming, graphics, Internet, and productivity software.

In 1998, the population of tambon Mae Moh was 17,778. The population of three villages represents forty-five percent of the tambon Sub-District population. Sixteen percent of the 117.5 square kilometers that the tambon occupies is dedicated for agricultural purposes while seventy

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[13] *Ibid*

[14] A district is referred to as a amphoe.

[15] "Lampang" http://thai.sawadee.com/north/lampang/ 11/10/01.

[16] A tambon can also be referred to as a sub-district which is a community of villages.

percent of the territory is situated on mountain. Based on a study done in the year 1996, the residents of the tambon had an average yearly income of 23,600 baht per household.[17]

Hang Hung was the first village we studied. In 1998, 442 households, about half of the Hang Hung village, was moved by EGAT to a "4,000 rai plot of Forestry Department land near Tha Pa Tun and Na Kam villages, so it could expand its mining area."[18] EGAT called off the plan of moving the rest of the village, but late 2001, the cabinet decided that EGAT should move the remaining 414 households to a section close to where the first group was moved. Khun Khao, the village leader, informed us that the village has been approved and is waiting to be relocated.

The second village we studied was Na Kam, approximately ten kilometers from Hang Hung. The village of Na Kam is almost three times larger than the other three villages we studied. According to Khun Boonthan, the village leader, the population of the village is approximately 7,000.[19] Na Kam is much more urban and looks more like a town than a village. The center of Na Kam has a market over half a kilometer long, consisting of street vendors and shops. There are two Internet Cafes in the village, each with ten computers. The village is located closer to MMW than any other villages.

Hua Fai is located on the far side of the lignite mine, approximately fifteen kilometers from Na Kam. Only two kilometers away is EGAT's dirt dumping area. The cabinet has asked EGAT to make plans to move Hua Fai to another area.[20] Since Hua Fai is farthest from the other villages as the nearest city, the village has a poor phone line. The village has only one public telephone. We observed while walking around in the village that Hua Fai is more rural than the other three villages.

The last village we studied was Huay King. The village is about four kilometers from Hang Hung and is located between Hang Hung and Na Kam. Huay King is approximately the same size as Hang Hung and Hua Fai with approximately 400 households. According to Dr. Nuntavarn, there is an average of four persons per household; therefore, the population of Huay King is around 1,600.

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[17] Information provided by our sponsor, Dr. Nuntavarn
[18] "Energy / Mae Moh Lignite Power Plant" *Bangkok Post*, January 27, 2002
[19] Interview with Khun Boontan
[20] "Energy / Mae Moh Lignite Power Plant" *Bangkok Post*, January 27, 2002

Each village, tambon, and amphoe has its own local government. The following section discusses the national as well as several different forms of local government of Thailand.

2.2.1   Local and National Government

Thailand is a constitutional monarchy with a combination of both appointed and elected officials. While the King is the head of state, many officials in the government are chosen by the Prime Minister, who is elected by the House of Representatives, not directly by the people. Similar to the U.S. government, the Thai government is separated into three branches, all of which are nominally overseen by the King. The King vests his judicial powers in the courts, his legislative powers in parliament, and his administrative powers in the ministries of the executive branch. The legal system is based on a civil law system, with influences from common law. The cabinet is responsible for the administration the executive branch, which consists of thirteen ministries led by the Prime Minister. A politically appointed minister heads each ministry with one or more deputy ministers.

Local governments and local self-governing bodies are two different forms of local government. The difference between the two forms is that the Ministry of Interior (MOI) appoints the local government officials whereas the local self-governing bodies are comprised of elected citizens. The MOI appoints government officials at the provincial, amphoe, tambon levels. In addition to these appointed government officials, there are elected governing bodies at the provincial, district, and sub-district levels.

Lampang province's administration is divided into 13 districts, 99 sub-districts, 761 villages, 15 settlements and one municipality.[21] The national government has 75 administrative offices and 20 state-run enterprises in the province. National and provincial offices are all named by the government, not elected or chosen by the people.

The Thai government has been recently decentralized, and is still rapidly changing. Much of Thailand is still 'learning' how to effectively run its own local government. For example, every village in Thailand is run the same way in terms of election and representation, even though many villages are very different in terms of population and economy. The basic system for election is that every four years, a "village head" is elected by everyone in the village who is

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[21] *Ibid*

fifteen or older. The village head must then leave any other job he or she has in order to run the village, and receives a modest salary of about 4,000 baht (about 100 USD) per month.

2.2.2   Electricity Generating Authority of Thailand (EGAT)

EGAT's lignite coal power plant, located in Mae Moh, is the largest power plant in the Kingdom and one of the largest complexes of its kind in Southeast Asia. It has thirteen generators producing a total of 2,025 megawatts each day, 22% of the electricity used in Thailand. EGAT has been in conflict with residents of Mae Moh over the air and water pollution the plant produces.[22]

In October 1992 and 1994 and in May of 1996, representatives of sixteen villages from Mae Moh marched to demand that their residents be moved to safer areas.[23] In 1995, EGAT installed Flue Gas Desulphurization (FGD) equipment on the plant's generators in order to help curb air pollution, but villagers still suffer from respiratory illnesses related to pollution from the dumpsites, mines, and generators.[24]

In 1999, provincial authorities demanded that EGAT set aside a budget of 50 million to 100 million baht in order to assist residents living near the power plant.[25] EGAT set aside 50 million baht for 16 affected villages: 20 million for projects proposed by the villages and 30 million baht for road and infrastructure projects.[26] These funds from EGAT have been used to help the villages of Mae Moh with various community projects for schools, hospitals, and have also provided some support for the IT centers in the four villages, later discussed in section 2.3.2.

EGAT's power plant is powered by lignite mined in areas in Mae Moh by two firms, Ban Pu and Chiang Mai Construction.[27] Villagers feel that the mines and lignite dumping sites cause air pollution, since lignite piled outside the mine and dumpsites oxidize in the air and bursts into flames, releasing more sulfur dioxide in addition to that produced by the generators' smoke stacks.[28] In 2000, the board of EGAT resolved to carry out the Wiang Haeng lignite-

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[22] Sunskai, Somsak. "EGAT Told to Help Mae Moh Folk". *Bangkok Post.*
[23] Poona, Antaseeda. p. 5
[24] *Ibid.* p.2
[25] Sunskai, Somsak. "Panel Affirms Decision to Shift Villages."
[26] Poona, Antaseeda. p. 6
[27] *Ibid.* p. 3
[28] *Ibid.* p. 2

mining project, which would involve securing the rights to explore and mine high-grade lignite in Chiang Mai.[29]

2.3 Information Technology (IT) Centers

The focus of our project will be the IT centers in the Mae Moh district. Similar centers, often referred to as telecentres, have been built around the world in developing countries. These telecentres have resources ranging from a single payphone to an entire building of Internet-connected PCs for educational and entertainment purposes. To better understand the purpose of the IT centers, the following sections first discuss the IT centers in Thailand and then focus on the IT centers in Mae Moh.

2.3.1 Purpose of IT Centers in Thailand

Thailand's main intention in creating these centers is to aid Thailand and its people in adapting to new realities and in benefiting from the dynamics of the global economy. Thailand is training its people for a generation of entrepreneurs who will respond effectively to today's technology-oriented economy. This can be seen by the recent policies of the royal government that will stimulate digital technology access in Thailand, which may result in the wiring of every district with at least one Internet connection by 2004. Economist Shawn Crispin, writing from Bangkok for the *Far Eastern Economic Review*, comments on these policies: "…we expect the multiplier effects of these policies will help generate jobs and income, stimulate domestic consumption at the rural and urban levels, enhance our competitiveness, and reinvigorate business confidence for wealth creation and mutual prosperity."[30] Such a statement implies that these new government policies, if carried out, will enable residents of all areas of Thailand to access digital technology and information, and may result in overall economic stimulation and prosperity for Thailand.

2.3.2 Purpose of IT Centers in Mae Moh

Dr. Nuntavarn of College of Public Health, Chulalongkorn University in Bangkok, designed a proposal to set up four IT Centers in Mae Moh. This is a project she wanted to carry out because she wanted to give something back to the community she has worked with. She felt

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[29] Kositchotethana , Boonsong.
[30] Crispin, Shawn W.

connecting people to the outside world via Internet would effectively help the members of the community. In the long run, the area's economy and quality of life can be improved by improving its educational and technological resources.

2.3.3   IT Center Funding

The funding for the centers originated with a grant to build and provide equipment for the centers. The long-term goal is that the centers will be self-sustaining and that the fees collected will cover the expenses of staffing, new equipment, and equipment maintenance. In a recent interview, Dr. Nuntavarn predicted that each center will require at least three computers with Internet access in order to earn over 100 baht per day and be sustainable. The first computer is the greatest cost because it incorporates the cost of the first Internet connection. After the first connection, the cost of adding additional connections is much lower. Three computers would ensure that there is almost always computer available for use.

The whole project, which consists of four IT centers in the four villages, received funds from three organizations: EGAT, American Corporation of Thailand (ACT), and the World Bank. The Kenan Institute manages all of the project's funds.

According to Dr. Nuntavarn, each center's operator's salary of 3000 baht per month currently comes from the fund money. Every month, what ever income the centers make, goes into their separate bank accounts and once the project funds run out, the centers would have enough seed money to be sustainable on their income and interest.

In addition to the funds from EGAT, ACT, and World Bank, the IT center in Hang Hung also received funds from the Canadian International Development Agency (CIDA). CIDA provided additional funds to purchase space and equipment for the center. Now that the center is operational, half of the center's income from computer and internet use are sent directly to a separate account. At the end of one year, if the center is able to cover its cost and sustain itself, it gets the money back. If the center fails to cover its cost, the funds are taken by CIDA and given to centers who did meet their expenses. This serves as an incentive for the centers to make the necessary effort to be profitable.

2.3.4   IT Centers in the Mae Moh District

There are four IT centers in four villages, which opened in December 2001. Each center has two computers, one printer, a TV and VCR, and a library of educational videos. In Hang Hung, the center funded by CIDA, there is also a facsimile and photocopier. In the future, there might be additional computers, as well as facsimile and photocopier in every center.

One of the main purposes of the IT centers is to help close the digital divide in Thailand by offering access to technology to every citizen. These IT centers also have other potential uses. For instance, EGAT could make information about their operations, environmental efforts, and job openings available from the centers. The centers could also help villagers access government information and print government forms without traveling to provincial offices.

2.4   Stakeholders in the IT centers

The section introduces background information about stakeholders involved with the IT Center project. For our purposes, all of the groups who have an interest in the centers, financial or otherwise, as well as any groups with a specific use for the centers are considered stakeholders. This includes officials of the local government, teachers from schools in the villages, and other groups of villagers that have a use for the centers. Most of the stakeholders are represented in the village's IT Center Committee. We devoted special attention to these different groups because they represent the overall opinion of the performance of the centers. The IT centers are administered in each village by a village committee, composed of government officials, teachers, the center manager, and other representative villagers.

The local government of Lampang province as well as the local government of Amphoe Mae Moh would like to make information and forms available online to villagers. The current system requires villagers to travel to a district government office to find a form, return to their village to complete the form, and then return to the office to submit the form. The IT centers would allow villagers to find these forms online, and save the villagers a trip to the district office.

EGAT also has an interest in the centers. EGAT's main objective is to have environmental information about the nearby power plant available online so that villagers could be better educated about the environmental impact of a coal mine and a power plant, as well as

what EGAT is doing to curb these impacts. EGAT would also like to have job placement and availability posted online for villagers to access easily.

There are also two significant groups of villagers that will be involved and have interests in the IT centers. First, Old People Playing Young (OPPY), a group for elderly citizens who have received special training on using the IT centers, and will also be able to represent the interests and opinions of the older villagers. Second, a women's group in Mae Moh was consulted while planning the IT centers. This group is interested in women's roles outside of the traditional role of women in Thailand.

3. Methodology

The IT Centers in Mae Moh are part of a current national movement involving members of Thailand's government, private businesses, and institutions such as Chulalongkorn University, to make computing technology and Internet access available to every resident in the country. A possible outcome of this movement is that it would help to bridge the digital divide in Thailand. Another possible benefit is that these kinds of projects could assist Thailand in entering the information age one step above other developing countries. In order to make these IT Centers as effective as possible, it is helpful to evaluate these IT Centers to find how well they are meeting their expectations.

This project was intended to determine the sustainability and accessibility of the centers in each village, as well as to develop a method of evaluating this in the future. We accomplished this by doing the following:

- Conducting interviews with stakeholders

- Distributing surveys to a variety of villagers

- Analyzing the interviews and surveys

The remainder of the chapter is divided into several sections. The domain of inquiry and definitions section defines some terms used frequently in the study and also defines specifically what issues were covered in our methodology. The next section contains an overview of our visit to Mae Moh and briefly describes our itinerary and work within the villages of Hang Hung, Na Kam, Hua Fai, and Huay King in the Mae Moh District. The stakeholder interview section explains how and why we developed the interview questions for our interviews with various stakeholders. The villager survey section describes the development of surveys for the villagers, and explains the various changes we made to the survey for each village. The assessment of accessibility and sustainability covers how we analyzed the results from the interviews, surveys, and other resources, such as documents and IT Center usage logs.

3.1 Domain of Inquiry and Definitions

Our project deals with assessing the accessibility and sustainability of the IT Centers in order to determine how effective they are and will be in shortening the digital divide. The purpose of this project is not to attempt to measure the digital divide. The second component of

our project involves creating a reproducible methodology that future groups can use to study the same or other IT Centers.

In order to complete our goals, we must first clearly define several terms.

Digital Divide:

There are two types of digital divide. The first is a difference in physical access to technology. In this case, one group has or can afford to use technology while the other can not. The second type of divide involves having the necessary knowledge and education to use the technology. In this case, some of those who can afford the technology gain no advantage because they do not know how to use it, while others do know.

Accessible:

An accessible IT Center is a center that anyone in the village can afford to use and can use to access information on the Internet. There are many important parts to this definition specifically that the centers must be affordable, the villagers know how to use the computers, and the computers can connect to the Internet.

Sustainable:

A sustainable IT Center is a center that can support itself long-term on its own income. The center is currently funded by several grants, but will eventually have to sustain itself.

3.2 Overview of Visit to Mae Moh

All of the fieldwork for our study occurred in the villages of Mae Moh. We resided in homes in four different villages during the course of our study. We stayed in each village approximately one week while we conducted our interviews and surveys. A schedule of our work is summarized below and included in Appendix F: Work Schedule.

3.2.1 Hang Hung

In Hang Hung we stayed at the home of Khun Khao, the village head. Her home was located close to the temple and the IT Center. We arrived on Friday, January 18, and spent the weekend getting acquainted with northern Thai village life which included walking around the village and introducing ourselves to the family and the neighbors. On Monday, January 21, we began to prepare and conduct surveys during the daytime and afternoon followed by interviews

in the evening. In addition we observed the quality of the computer and Internet resources and we tested email access. However, we tried to never use the equipment at the center when someone from the village was waiting to use a computer. We recognize that our presence at the IT Centers was potentially disruptive, but we tried not to interrupt the routine of the users of the IT Centers.

3.2.2   Na Kam

On Friday, January 25, we moved to the village of Na Kam. Our transportation between villages was provided by EGAT. We were hosted by Khun Boonthan, the village head, but stayed at the home of his sister, Pii Meao. Na Kam was a much more urban village than Hang Hung, and also much larger. The village had two internet cafes in addition to the IT Center.

We made some necessary modifications to the survey such as changing several words that did not translate well into Thai and by placing similar questions closer to each other in order to make it more understandable for the villagers. We began conducting surveys immediately after changing the survey. We conducted our interviews on weekday evenings when both our interpreter and interviewees were able to meet. This was also the first village where we conducted the survey in the primary school in addition to handing them out at the market and the IT Center.

3.2.3   Hua Fai

We arrived in Hua Fai on February 4, and stayed in the home of Pii Supin, one of the teachers in the primary school. Her home was part of the school complex, and directly across the street from the athletic field and classrooms. Each day we ate our lunch in the dining hall with all of the students and teachers. We had ample time to talk with students and surveyed the two oldest classes in the school. We also interviewed the English teacher, Ton, because he had an interest in computers and taught many of the students about using computers.

Waan, our interpreter, could not travel all the way to Hua Fai every evening, so we had Ton help us translate for the interviews.

3.2.4   Huay King

On February 8, we arrived in at Huay King, and we stayed with the family of Khun Yaun. We found that our survey needed very little correction from the previous week. During our stay

in Huay King, we traveled to Na Kam one evening to interview the women's union, and we traveled to Mae Moh Witaya (MMW) during the day to interview trained teachers. We conducted interviews in the evening, but were unable to find a time to interview the center operator. We had a list of questions translated and then the operator answered each of the questions in writing and we had the answers translated to English.

3.3 Interview Stakeholders

At each village, an IT Center committee is entrusted with the responsibility for setting up an operating plan for the IT Centers. We interviewed stakeholders of the IT Centers to determine steps taken by each committee to ensure the accessibility and sustainability of the center.

3.3.1 Generating Questions

We structured our interviews to find out information about the operation and administration of the IT Centers. This information included the views of stakeholders regarding the centers' location, hours of operation, staffing, and funding. We tailored the interview questions to cover all of these areas.

Different stakeholders were familiar with different parts of the IT Center operation. We asked questions of each stakeholder that related to their areas of knowledge of the centers. For example, we asked the operator, who personally manages the center, about the usage of the center, and directed questions regarding funding of the centers to the village head and the center committees. High school teachers and groups of villagers seemed to be relatively unfamiliar with the IT Centers, so we asked them about what they would like to use the centers for and how they would use them.

We developed a list of several questions that were intended to gather detailed information regarding center location, operation, and funding. We then asked a subset of those questions in each interview. As we conducted different interviews and discussed each one amongst ourselves, we noticed that there were a few possible questions we had overlooked. We added these questions to our larger list of interview questions. In the end, we had a complete set of questions grouped by topic so that a future evaluation could be conducted more easily.

3.3.2   Interview Details

As we began the project, we identified the several areas we needed to research including the hospital, the schools, the local government, and local groups such as the Women's Union or a group for older villagers.

We expected to use interviews rather than focus groups to collect this information. Normally, a focus group would be a good choice of a data collection method. However, students who had completed previous projects in Mae Moh told us that focus groups did not work well in their experience. In mixed groups of people, one person took complete control of the conversation. In focus groups, as past project teams had discovered, the conversation was often dominated by one man whom no one interrupted or dared to disagree with out of respect, which is a typical pattern in Thai culture. Even after switching to segregated focus groups (one all male, one all female, one all youth), previous Mae Moh project teams still had trouble getting more than one or two of the representatives to voice their opinions. For these reasons, we planned to do all of our data collection through interviews.

3.3.3   Conducting Interviews

We interviewed several representatives of each village's IT Center committee, as well as other people related to the IT centers in general. These representatives included the village head, the manager of the center, and a few or all of the members of the committee. We also planned to interview the director of the hospital, all of the trained teachers at Mae Moh Witaya (MMW), Dr. Nuntavarn's technical assistant, and a representative of EGAT involved with the centers. A sample of the interview questions, as well as notes from each interview, can be found in Appendix B: Stakeholder Interviews.

The language barrier made it impossible to do more than a few interviews in English. This problem was easily solved, however, when we met Nonglak Yingsuksantisuk, nickname Waan, a villager of Na Kam, who was also a high school student fluent in English. She was willing to serve as a translator so that she could practice her English. We met her in the evenings and she translated our interviews. At first, we thought conducting interviews only in the evening would be a constraint, but we later found that the evening was the best time to interview people because they were not so busy. We did find that because of the time limitation and logistics, we

did conduct focus groups with the village committees. These focus groups did not pose some of the problems that we had expected.

We spent about one week in each of four villages in Mae Moh. We conducted a similar evaluation in each village over the course of a week. We scheduled the interviews early in the week so that we were sure to fit in as many as we could, and we devoted our time during the weekdays administering our surveys. We found this sort of weekly schedule to be rather successful. A schedule of our work in the villages can be found in Appendix F: Work Schedule.

3.3.4 Interview Results

The notes from our interviews are included in Appendix B: Stakeholder Interviews. We summarize these interviews in the Results chapter. In our analysis, we reviewed and discussed our interview notes and were able to put together a good idea of what each interviewee expected out of the center. We were also able to see the steps taken by stakeholders to make the centers both accessible and sustainable.

3.4 Villager Surveys

The next step in our project was to survey the villagers so that we could determine their opinion of the centers and if the centers were actually accessible and sustainable.

3.4.1 Generating Questions

The purpose of our survey was to ask people their opinions about the IT Center. We designed our surveys to find out how frequently people actually used the center, what they used it for, or why people did not use the center. We also asked basic demographic information such as age, sex, education, and occupation from users and non-users of the centers. We created a preliminary set of questions and had the questions translated into Thai for a one-page survey.

3.4.2 Conducting the Survey

We attempted to achieve a diverse sample set for our survey which would include users and non-users and represent a diverse spread of ages and income levels. We placed surveys in the IT Center and asked every user of the center to fill one out. To obtain a broad sample of non-users, we walked through the villages and asked people in the market area and people in their homes to fill out a survey. This worked well, but was very time consuming and difficult because of the language barrier.

In our second village we decided to visit the village elementary school. We very briefly explained ourselves to the students in Thai, and then distributed the survey to the school's oldest class of students, who averaged around twelve years old, in the equivalent of sixth grade.

3.4.3   Survey Changes

After conducting nearly one hundred surveys in each village, we determined that parts of the survey were confusing and needed to be clarified. We observed confused faces and recognized contradictory answers. For example, someone might check that they did not use the IT center, but also answer that they used the center for email three times a week.

During our stay in Hang Hung and Na Kam, we improved the survey by changing several words that did not translate well to Thai, such as 'affordable'. We changed the question "Is the center affordable?" to "Is the center expensive?" and found people were no longer confused by the question. We also re-ordered the questions so that they flowed more logically. When we placed the questions "Do you use the IT Center?" and "How often do you use the IT Center?" next to each other, we found significantly fewer inconsistent answers. We also placed all of the yes/no questions in a chart to make it easer to check the yes or no answer, and comment on it. All four surveys are included in Appendix C: Villager Surveys.

3.4.4   Survey Results

In order to ensure a diverse sample set, we surveyed people in every village in several locations including the IT Center, commonly visited parts of the village, and at the elementary school. This method of collecting surveys did not enable us to estimate what percentage of people in the village use the IT Centers; however, we were able to collect some demographic information about the people who do use the centers, such as age, sex, education, and occupation. We were also able to record several reasons why people did not use the centers.

3.5   IT Center Logs

During our stay in each villager, we also studied the IT Center's log. The log is kept by the center operator not only to keep track of the log's income, but also to keep track of various pieces of information such as names, ages, and what websites were visited or what programs were used.

Each village has three or four books to be used as logs, but not all of four IT Centers collect the same information. In some of the logs, the format and types of information changed after a few weeks. Despite this fact, the logs provided a good overview of the usage of the center, and were critical in allowing us to assess the income and usage of the center.

3.6 Assessment of Accessibility and Sustainability

The answers to the interview questions and the responses to the surveys are all useful information, but need to be put in a useful form in order to be analyzed. After completing the interviews and surveys, we combined the information we collected and assessed the IT Centers, village by village. Once we assessed each village, we compared and contrasted the villages to each other. Finally, we analyzed the tools we created to help our data collection.

3.6.1 Data Sources

There are many different sources of information that were used in our analysis. The surveys that we conducted allowed us to understand the administration of the IT centers, the details of their operation, and the stakeholders' expectations of the IT Centers. The surveys, on the other hand, let us know some user demographics, and reasons for not using the center. We also referred to the IT Center logs to see detailed usage of the center's resources. Possibly the most important source was our observations over the course of the week in each village, along with the impressions each of us had about each village and center.

3.6.2 Assess Each Village

We spent approximately one week in each village to conduct our entire evaluation. For this reason, we will analyze each village separately. The first step in assessing each village was forming a consensus about our opinion of the Center in that village. This was a gradual process that took place over our one month stay and took the form of group discussions that resulted in a general view of each village that we all shared. Then, we used the information from the surveys, interviews, and logs to assess the sustainability, and accessibility of each center using a weighted value analysis.

3.6.2.1 Weighted Value Analysis

We used a weighted value analysis in order to quantify our results. Applying a weighted value analysis also allowed us to numerically compare the sustainability and accessibility of each

center. Based on our definitions of accessibility and sustainability, we broke each down into a list of measurable factors. We each then took the list and individually weighed the importance of each factor on a 1 to 5 scale, where 5 is most critical. We then convened as a group to compare our weights and discuss until we agreed on a weight for each factor. After reviewing all of the results, the team repeated a similar process, except instead of assigning weights to each factor, we assigned ratings of each factor to each village's IT Center. Once again, we met and discussed until we came to an agreement on each rating for each village.

The overall rating of each aspect of each center is essentially a weighted average of all of the factors. The sum of the products of the weight and rating for each village, divided by the sum of the weights, yields a rating from 0 to 5. This value is merely an arbitrary number, but can be used to compare the centers to each other, and can also be used to determine which areas of improvement will be overall most helpful.

3.6.2.2   Personal Opinion of Village

Our week in residence in the village makes our study unique. Our impression of the village and the IT Center is something that no survey or interview could match. While living in the village, each of us kept a journal of our observations and impressions of the village. At the end of our stay, we gathered as a group and shared opinions of the village regarding things like the location, housing, residents, and the IT Center of each village. We combined our impressions to arrive at a mutual subjective analysis of each village and its IT Center. We used this initial subjective analysis in what we looked for when we conducted analysis of the sustainability and accessibility.

3.6.2.3   Sustainability of IT Center

Currently the IT Centers are being funded by grant money. When all of the grant money is consumed, the centers will have to be commercially sustainable. This is dependent on the amount of use the center will get. By reviewing the center's logs, we were able to determine the center's income. During our analysis of the completed surveys we were able to roughly estimate the current use of the center. From these two sources we were also able to make additional estimations concerning whether or not the center currently generates enough income, if the use of the center will increase, decrease, or stay the same. We finally applied a weighted value analysis to determine a numeric evaluation of the sustainability of each center. We rated each of

the centers based on the current income of the center, number of users of the center, potential increase in number of users, quality of service at the center, and the exclusiveness of the market.

3.6.2.4   Accessibility of IT Center

It is very important that the center be accessible to everyone, regardless of age, gender, education, or economic status. Our observations, the IT Center logs, and the results of the surveys let us know who is using the IT Centers. We examined the data and determined which groups use the center, and which groups do not use the center. Using the surveys of non-users, we were able to notice certain trends regarding how people answered questions regarding why they did not use the centers. Afterwards, we used the trends to point out main reasons why people do not use the centers. We then looked back to the notes of our interviews to see if stakeholders either acknowledge these problems or are doing something to solve the problems the non-users have. Finally, we applied the weighted value analysis to quantify the accessibility of each center. We based our analysis on the location of the center, availability of a computer, computer literacy of the villagers, affordability of the center, and quality of the Internet connection.

When we have taken those steps and determined who uses the centers and what the stakeholders are doing to make the centers more accessible to everyone we can focus on determining how accessible the centers may be in the future. For example, if one of the results from our survey highlights a particular problem that prevents certain people from using the center and the stakeholders are not even aware of it, it may take longer for that problem to be solved than if the stakeholders were aware of it.

3.6.3   Compare Villages

After generating our assessment of each individual village, we compared the villages to each other. Although our survey changed significantly from village to village, we are still able to compare our observations and conclusions for each village. We compared the villages based on the village itself, the IT Center and its use, and also the villagers themselves.

We compared the village based on many factors such as physical size, population, location, and average income. We noted the differences in occupation, quality of life, education and other factors that differed in each village. We also noted the attitude of villagers about the IT

Centers and technology in general. These factors made each village a very different environment, and this affects both the IT Center and its use.

The IT Centers are slightly different from each other as well. We compared the equipment in each center, as well as the use of the equipment in the centers. We also compared other variables, such as the quality of the resources, as well as the existence of other similar resources in the village.

3.6.4   Assess Tools

As a final step, we assessed the tools we had used to conduct our evaluation, namely the survey, interview questions, and methodology for distributing them. We compared the responses to each of the four surveys, as well as our observations of people completing each survey. This allowed us to determine how accurate the answers were to the survey. We chose the interview questions that yielded the most useful answers, and eliminated the ones that were least helpful. The result was a brief but complete list of questions concerning the centers. We also looked at the results from all of our surveys and interviews and determined which were valuable and which were less helpful in order to determine which need to be included in the future.

The end result of analyzing all of our tools is useful as a recommendation for using the tools in a future study.

4.   Results

Our interviews and surveys from each village provided a large amount of information about the centers, how they are run, and what people think about them. This chapter presents the results of our interviews and surveys village-by-village.

The first section covers interviews with the computer teachers at Mae Moh Witaya (MMW). These interview results do not apply to any single village since the high school educates students from all of our study villages and more. The following sections summarize our results from each of the four villages. The interview questions and notes are included in Appendix B: Stakeholder Interviews.

4.1   Interview with Mae Moh Witaya (MMW) Teachers

Before the Information Technology (IT) Centers opened in the Mae Moh District, four teachers from Mae Moh High School (MMW) attended a seven-day seminar in Bangkok. The teachers were trained to teach students how to use computers and Internet. We interviewed two of these four teachers to find ask about their training and their opinions on the effectiveness of the centers in the four villages.

4.1.1   Interview with Ms. Patcharaporn Tongsa-ard

This interview with Ms. Patcharaporn Tongsa-ard took place at MMW on January 29, 2002. Ms. Patcharaporn told us about the school's computer education program. The school has had computers for over 10 years, but recently received 22 new computers and an Internet connection in December 2001. The school also has a new computer curriculum that covers all 6 years, and is covered in Table 1: Computer classes at Mae Moh High School.

She commented that she feels that computer class is the favorite subject of students, but the main problem that she has encountered with teaching computers is that students cannot work at home in order to practice what they learn. The computer lab is open for students one hour before and one hour after the normal school schedule to give students more time to practice what they learn. Approximately 30 students per day use these extra computer hours at the school.

Currently, the school has 22 computers, and these are all connected to the same modem. As a result, Internet speed is usually very slow and is efficient only when a small number of computers are used. Ms. Patcharaporn also told us that kids constantly play computer games,

which she did not like because it distracts them in class. She commented that the younger students do not know how to use computer for anything except games, but the older students are interested in email and chat programs.

She has visited all four of the IT Centers. She firmly stated that the IT Centers were an excellent idea and that they would be even better if they had more computers. She put great emphasis on the necessity of building IT Centers in every village in every tambon. That way, all students from MMW, and every high school, can access the Internet in their own village. This would allow her to include computer assignments in their homework.

Equivalent Grade	Topics Covered	Age	Duration
1	Basic Computer (history, theory, etc)	13	
2	Data base, Programming (Basics)	14	1 Term
3	Graphics (Photoshop, Power point, Media Director)	15	
4	Information technology, and computer (Internet)	16	
5	Microsoft Word	17	2 Terms
6	Microsoft Excel	18	

Table 1: Computer classes at Mae Moh High School

4.1.2   Interview with Mr. Sakdid Srikaentum

On February 11, 2002, we interviewed Mr. Sakdid Srikaentum, the head of computer department at MMW. Mr. Sakdid thinks that the IT centers are a good idea, but he is not familiar with their actual use. His experience tells him that young children like to use computers very much, but mostly to chat on the Internet and for games. He feels that using computers to play games is a waste of both the computer and the user's time, and instead they should be learning to use the computer for constructive purposes.

Mr. Sakdid considers knowledge of both applications and the Internet as equally important for student future. He said that since very few students have computers at home, computer-based learning cannot continue after they leave school. He also said that he tries to get the students with computers at home and are familiar with using computers to help the other students that are new to computers.

He thought that most students will use the IT center only for chat and games. He is trying to change these habits among his computer students by getting them involved in other computer uses. Mr. Sakdid has visited the IT Center of Na Kam and the Internet Café in Na Kam. He suggested that the centers should be specifically used for computer-assisted teaching so that there would be more educational benefit to the centers.

Mr. Sakdid told us that several other teachers at MMW knew how to use computers. Several use email regularly, and a few use Internet resources to help them teach.

4.2   Hang Hung

Hang Hung, located near Huay King, was the first village we studied. It is approximately four kilometers south of Huay King. Hang Hung has 414 households with a population of 1,600. The IT center is located in the center of the village near the village temple.

After living in the village for a week, our observation was that the entire village was excited about the IT Centers. During the day, some housewives and others would visit the center for various reasons that we will describe below. In the afternoon, school age children would flock to the center by the dozen to play computer games. In the evening, older students used the center for chat, email and occasionally research and translating Thai and English. The center had a fairy good Internet connection. The center's daily minimum income is 100 baht and the daily maximum income is 200 baht.

4.2.1   Interview Details

We conducted three interviews in Hang Hung. We interviewed the entire IT Center committee as a group, the village head alone, and the IT Center operator.

The village committee was very proud of the IT Center. They wanted the center in their village so that their children would have the same access to information as children anywhere in Thailand. A major problem, however, is that there was no one to teach other villagers how to use computers. Only current high school students received any sort of training, and this was not enough for them to be completely familiarized with computers. The committee commented to us that the IT Center operator could run the centers well, but was not knowledgeable enough to teach other people to use computers and to answer all of their questions. Finally, the village

committee was interested in receiving some central government funds to help with the center, but there is too much red tape, and acquiring funds takes too long.

The village head gave us more detailed information about the funding of the IT Centers. She told us some of the details and clauses of CIDA's funding of the centers. For the first year of operation, the center must direct one half of its income from computer and Internet use into a separate account. After one year, if the center has been able to cover all of its expenses, CIDA returns the money in the account. If the center was not able to sustain itself, CIDA takes the money in the account and uses it to reward the centers that are most successful. This plan serves to give extra incentive for centers to become self-sustainable.

Khun Khao is glad that the center gets a lot of use, but would rather it be used for constructive purposes instead of games. Games are good because they help people become comfortable using a computer, and games make up a large portion of the center's profit, but games also occupy the computers that could be used for other purposes. She hopes that if the center has more computers, they would not all be occupied with games.

Many villagers know nothing about computers, or only know how to play games. She feels that the villagers would benefit from someone who would teach them how to use the computers for whatever they need. Khun Khao would also like to see the center expand. In addition to more computers, she feels it might be helpful if the center received daily newspapers or a collection of books to complement the resources available online.

Our interview with the IT Center operator gave us useful information about the center. Villagers of all ages use the center, but users tend to be mostly teenagers. In the afternoon, younger kids like to run around outside and into the center, and play games. Some of them are rather rough with the equipment, and she feels it might cause a problem one day.

She felt that the computers are used for games too frequently and it prevents others from using the centers. Adding more computers means that more computers would be occupied with games. She thinks it might be a good idea to expand the center in other ways in addition to adding computers. She feels that a small library, VCD rentals, and maybe video games on the TV would be good for the center.

Although the center is frequently occupied with games, she is impressed that Children found the games on the computer since most of them have never used a computer before and were not told how to find the games on the computer.

4.2.2   Survey Details and Changes

We surveyed a total of 64 villagers in Hang Hung. Table 2 shows a breakdown of the respondents by occupation. The results recorded in Table 2 are also plotted in Figure 4.

Occupation	# Surveyed	% Surveyed	# Users	% Users
Student	25	39.06%	16	43.24%
Laborer	13	20.31%	7	18.92%
Farmer	2	3.13%	0	0%
Merchant	8	12.50%	6	16.22%
EGAT	1	1.56%	1	2.70%
Housewife	6	9.38%	2	5.41%
Other	9	14.06%	5	7.81%
Total	64	100%	37	100%

Table 2: Occupation and Center Use of Those Surveyed in Hang Hung
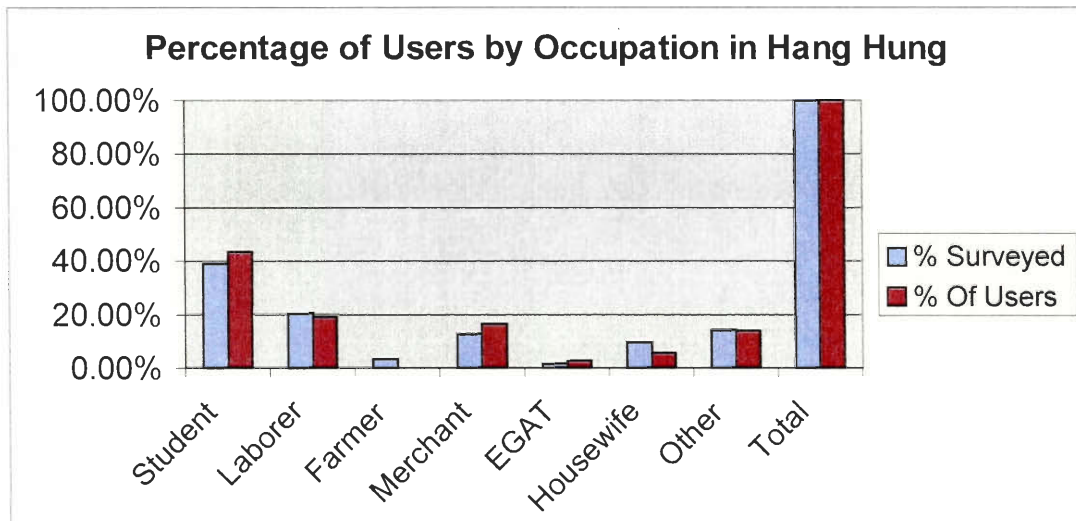
Figure 4: Breakdown of Users by Occupation in Hang Hung
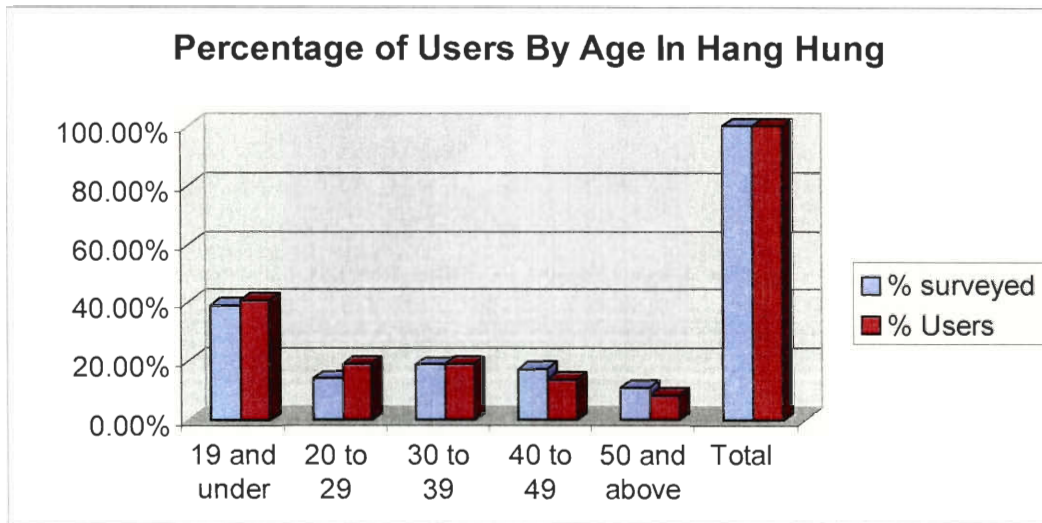
Figure 5: Percentage of users by age in Hang Hung Village

The survey included some contradictory results. Six people indicated the frequency they use the center, but none of these respondents had said that they used the center in a separate question. Seven people said that they had never used the center and that they would continue to use it. 25 people who were age twenty-five and above indicated that their parents know that they use the center. We had intended this particular question to be primarily for those surveyed that were twenty and under. Eight people who said that they used the center also said that it was not affordable.

In addition to these ambiguous answers, we observed behaviors of the respondents as they completed the survey that suggested that many people did not understand large parts of the survey. The survey was organized in two columns on one side of one piece of paper. Before using the survey in the next village, we revised the survey to fit on one page in one column, and group similar questions more closely. We also removed most of the open-ended questions and placed all questions regarding usage into a single table with separate columns.

4.2.3   IT Center Logs

The logs of the IT Center at Hang Hung provide us with information about the villagers that frequented the center. Some times, the purpose of their visit was noted in the books, as well as their age, gender, and the time of their visit. But because of inconsistency between different resources, comparison of the information in the logs and the information collected through our

surveys will be limited to the distribution of users by age. Figure 6 plots the percentage of users by age in Hang Hung.
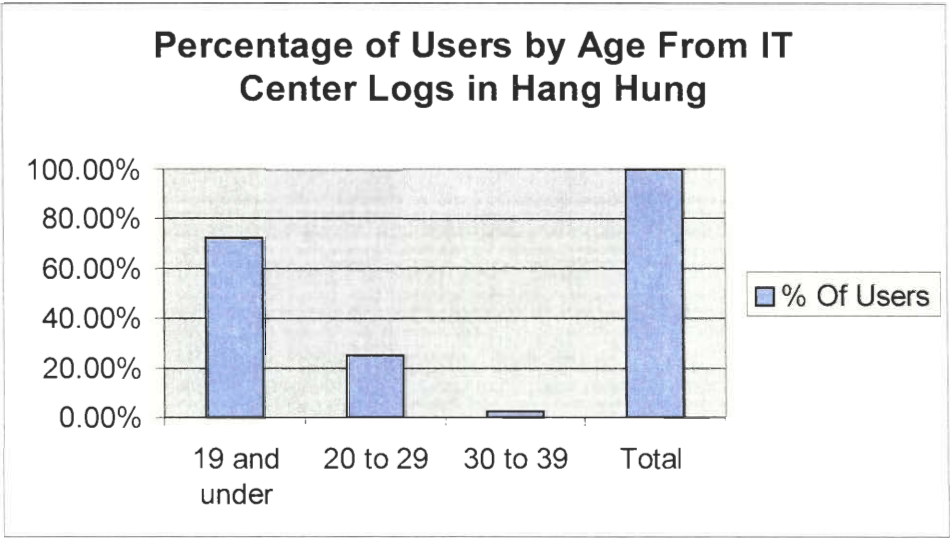
Figure 6: Breakdown of users by age from Hang Hung Log

4.3 Na Kam

Na Kam was the second village we studied and was located approximately ten kilometers south of Hang Hung. The population of the village is approximately 7,000 and it more closely resembles a small town than a village. The IT center is located in the center of a village market.

After living in the village, our observation was that the community did not show enthusiasm or excitement for the center as much as the villager of Hang Hung. This might be because of two existing Internet Cafes in Na Kam, which are discussed in details in Section 4.3.4: Internet Cafes in Na Kam. The center had a poor Internet connection. The center's daily income is an average of 50 baht.

4.3.1 Interview Details

We conducted three interviews in Na Kam. We interviewed the center operator, the IT Center committee, and the Women's Union.

Khun Boonthan, the village head, as well as the entire center committee is excited about the center. Their major concern is that the community does not seem to care much about the center. The IT Center in Na Kam faces the same problem as the Hang Hung center in that there is no one to teach the villagers how to use the computers or to tell them about its usefulness. The

committee does not like the idea that students use the center only to play games. They would like people from all age groups to try to use the center.

The committee recognized that a major problem for the center is competition from the two Internet Cafes. The committee believed that since the center doesn't have enough computers and low quality Internet connection, users rather go to the Internet Cafés, which have more computers and better Internet connections. The committee believes that if the center had name brand computers and better connections, villagers would use the center because it is cheaper than the Internet Cafés.

In an interview, the center operator reported that the most frequent users were teenagers and children. Teenagers mostly used the center for email and chat programs and other Internet related research for school. The children use the computers mostly for playing games. The daily income of the center is an average of 50 baht per day because the center has very few users. The users usually get frustrated with the slow connection and go to one of the Internet Cafes. She also informed us that the center has only few users because several villagers have computers and Internet connections in their homes.

On the evening of February 11, 2002, we held a focus group with nine members of the Na Kam Women's Union. The Women's Union meets once a month and supports village activities by selling artificial flowers and supplementary work around the village. They have established a bank for the group and for others who are interested. About eighty percent of the women in Na Kam are involved in the Union.

Currently, some members of the Union use the IT Center for word processing to make schedules and other documents. They do not use the Internet because they do not know much about it and do not know how to use it. The members are interested in learning to use to computers but they do not have anyone to teach them about computers. The group does not help other women to learn to use computers, but they plan on having a class to teach about computers at the center. Since the Union sells its products to the villagers, we suggested that they publicize or advertise their products on the Internet so that they can expand their market of potential buyers beyond the residents of Na Kam.

When we asked a question about children using the center for playing computer games, we received similar responses in all three interviews. The IT Center committee and the center

operator do not like children using the center for games, but they also believe that once children learn how to use other computer applications and discover the importance of Internet, they will gradually begin to use these as well. The members of the Women's Union want their children to realize how useful the Internet can be. They do not completely disagree with their children plating computer games, but they are concerned with the content of the video games.

4.3.2   Survey Details and Changes

In Na Kam we surveyed 76 villagers of which 38 were students. Table 3 represents the occupation of the survey respondents. The results recorded in Table 3 are plotted in Figure 7.

Occupation	# Surveyed	% Surveyed	# Users	% Users
Student	37	48.68%	15	68.18%
Laborer	11	14.47%	2	9.09%
Merchant	14	18.42%	4	18.18%
Teacher	1	1.32%	0	0%
Housewife	2	2.63%	1	4.55%
Doctor	1	1.32%	0	0%
Hairdresser	1	1.32%	0	0%
Other	9	11.84%	0	0%
Total	76	100%	22	100%

Table 3: Occupation and Center Use of Those Surveyed in Na Kam
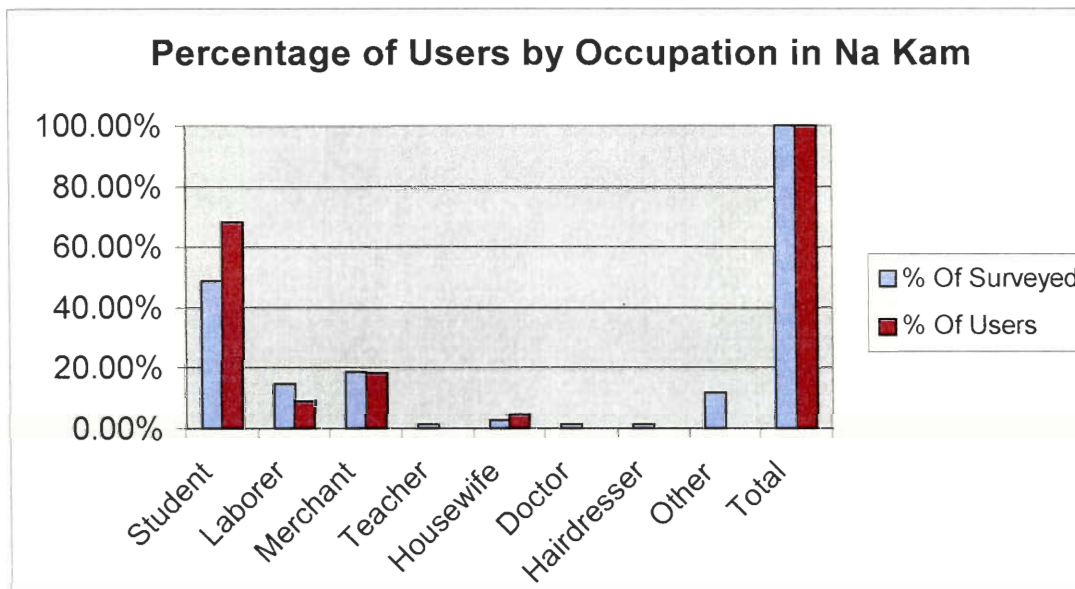
Figure 7: Breakdown of Users by Occupation in Na Kam

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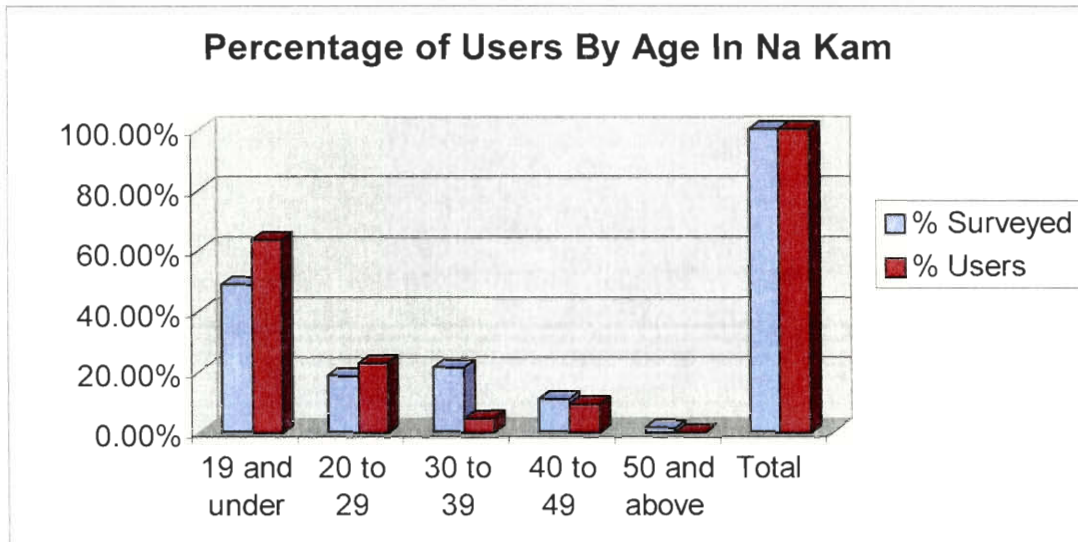
Figure 8: Users by Age in Na Kam

Eight people who said that they had never used the center also indicated that they would continue to use the center.

4.3.3   IT Center Logs

After reviewing the logs obtained from the Na Kam IT Center, we observed that the logs did not contain any information on the age or gender of the user. The most popular website visited by the users was Pirch98, a chat program. We observed that the chat program was used 20 out of 23 times.

4.3.4   Internet Cafes in Na Kam

Na Kam has two existing Internet Cafes, each with 10 computers. One of the cafes was located on a main road of the village, which might be more convenient for some villagers. The second café was located on a side street at the end of the village market. After observing one of the cafes and interviewing the IT Center operator, we learned that when the center users get frustrated with the slow Internet connection, users end up going to the café. Children prefer to use the computers in the café mainly because the café has more computers. In the café, ten children can play computer games at the same time instead of having two children play and the rest of the group watch.

Even though the Internet Cafes (on average) cost about five baht more per hour, they present competition with the IT Center. While observing the cafes, we identified at least two

possible reasons for the competition. First, the computers, printers, and the Internet connection at the cafes are of higher quality than those in the IT Centers. Although the source of financial support for the Internet Cafes is unclear, they may receive financial assistance or start up funding from CS Internet, a company that is heavily advertised in the cafes. Second, the cafes have air conditioning in addition to fans, at least ten computers each, extra chairs, and a slightly faster Internet connection speed. It then seemed of little wonder to us why users are willing to pay extra to use faster computers that are in a more comfortable room.

4.4   Hua Fai

Hua Fai was the third village we studied and was located the farthest away from the other villages and is closest to the EGAT mine and power plant. Hua Fai is approximately fifteen kilometers away from the other three villages we studied. Hua Fai has approximately 400 households with a population of 1,600. The IT Center is located in the center of the village with a library in the same building.

After observing the center and the village for a week, we observed that the center was popular among students, but not all villagers were aware of the existence of the center. The center had a poor Internet connection. This is because it is the farthest away from the center of Lampang and the phone line has a weak signal. Almost no one in the village has a computer at home, and no one has an Internet connection at home. The center's daily maximum income is 300 to 400 baht.

4.4.1   Interview Details

We conducted three interviews in Hua Fai. We interviewed the center operator, the village head, and the English teacher from Hua Fai primary school.

Our interview with Khun Dun Wongnai, the village head, suggested that he was not well aware or informed about the center. This might be because the English teacher acted as our translator and some information might have been lost in translation. In a later interview, Dr. Nuntavarn told us that he was a new village head and has attended the monthly meetings. He believed that the center is accessible and affordable to everyone and that the committee cannot raise the price because household income in Hua Fai is low. He also thought the quality and quantity of the computers to be very poor.

The interview with the center operator provided detailed information on the center itself. The center is used by people of different ages varying from seven years old to forty years old. It is also used mostly for games, for the Internet sometimes, and seldom for word processing. She also remarked on the problems associated with the resources available at the center. She believes the center does not have enough resources and could benefit from books about computers as well as daily newspapers. The computers crashed twice a week and the Internet connection is slow. Her greatest complaint is that the building is too small. Before the center was built the villagers used the school for meetings and other activities. These activities have continued since the IT Center opened, and the building often gets very crowded.

All problems aside, she believes the center is definitely a good idea and she tries her best to teach children how to use Internet and other programs so they do not play games as much. She believes the center will be successful and sustainable because the maximum daily income of this center is 300 to 400 baht. She also believes more people would use the center if the Internet connection were faster, and if there were more computers. There are no other alternate locations with computers or Internet access in the village.

On February 7, 2002, we interviewed Khun Ton, a Hua Fai primary school English teacher. Khun Ton lives in Lampang City but has been a teacher in Hua Fai for three years. He said that the primary school owns two computers, which the students use for playing games and for word processing, but the school does not have computer classes for students. The school computers have no Internet connection because it has not been a priority to have Internet connections in primary schools. Children play games because they do not know how to use any other programs. If they were taught to use other programs, they would not play games as often as they do now. He believed students are excited to learn more about computers and for this reason the IT Center should be a success.

4.4.2   Survey Details and Changes

In Hua Fai we surveyed 90 villagers of which 79 were students. Out of 90, 63 villagers used the center. Table 4 shows the breakdown of respondents by occupation. The results of Table 4 are plotted in Figure 9.

Occupation	# Surveyed	% Surveyed	# Users	% Users
Student	79	87.78%	56	88.89%
Laborer	5	5.55%	4	6.34%
Farmer	1	1.11%	1	1.59%
Merchant	1	1.11%	0	0%
Government	1	1.11%	1	1.59%
Other	3	3.33%	1	1.59%
Total	90	100.00%	63	100.00%

Table 4: Occupation and Center Use of Those Surveyed in Hua Fai
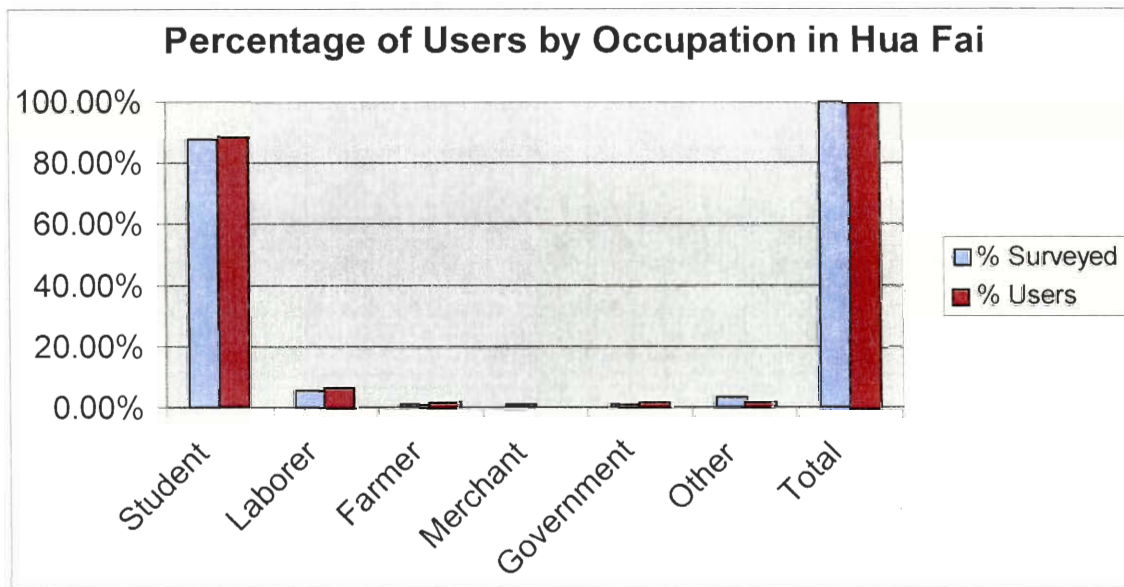
Figure 9: Breakdown of Users by Occupation in Hua Fai
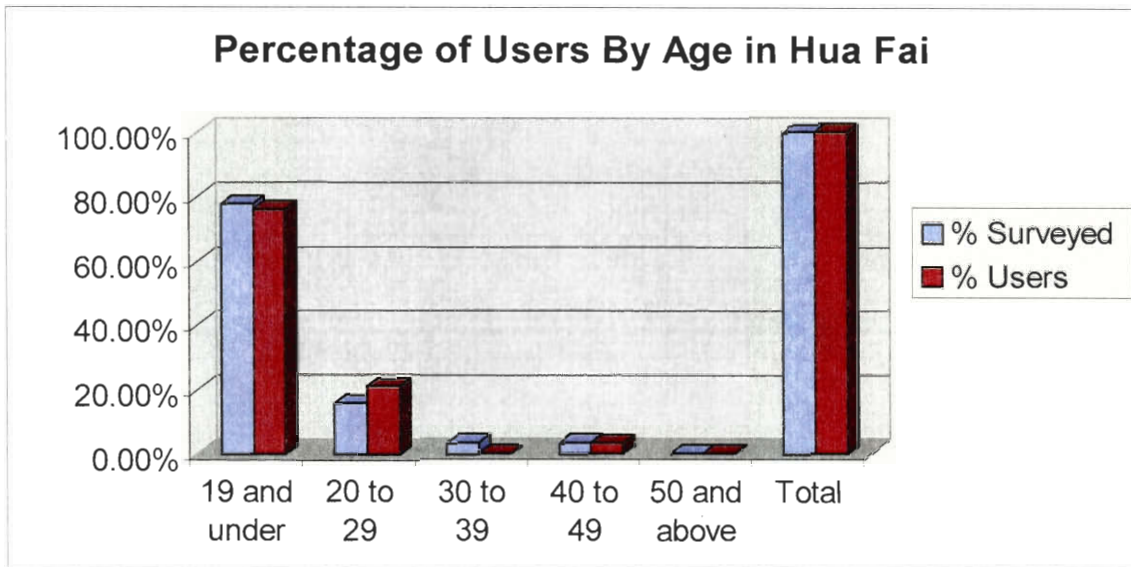
Figure 10: Users by age in Hua Fai Village

4.4.3 IT Center Logs

The logs of Hua Fai contained information about the age and the use of villagers. Figure 11 shows the breakdown of users by age taken from the logs data.
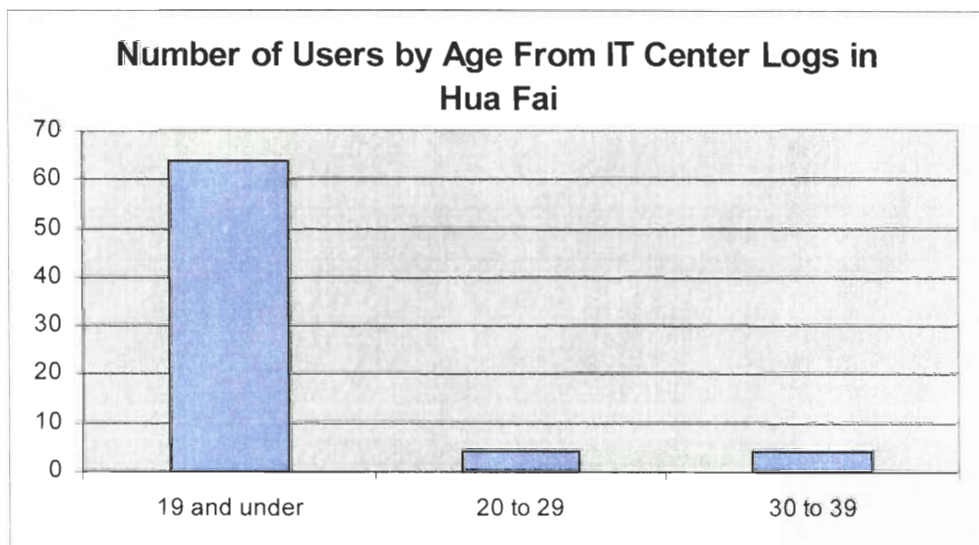
Figure 11: Breakdown of use by age from the log.

4.5 Huay King

Huay King, located between Na Kam and Hang Hung, was the fourth and last village we studied. The village has approximately 400 households with a population of 1600, similar in size to Hang Hung. Huay King is approximately four kilometers from of Hang Hung. The IT Center is located in the primary school.

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Our observations indicate that the center is in the best possible because many students use the center immediately after school and many other students remain in the vicinity to play sports in front of the school for much of the afternoon. Many villagers are excited about the center, especially the children. The teacher at the school uses extra time to demonstrate the Internet and email, and also encourages students to use these facilities on their own time as well. The center has useable Internet connection. The daily income of the center is approximately 150 baht.

4.5.1.1 Interview Details

We conducted two interviews in Huay King. The first person we interviewed was Khun Sanun, the village head, and the second was the teacher who serves as a caretaker of the center at the primary school.

Khun Sanun seemed excited about the center and has tried his best to inform the villagers about the benefits of the center, including how computers can affect their lives, in order to persuade villagers to use the centers. He expected teenagers to use the centers mostly for study, research, and to learn more about the outside world. The center should be accessible to everyone, and is cheaper than what they would find in the city. His greatest complaint is that his advertisements of announcements and meetings have not reached all the villagers. His main goal is to have every villager use the center at least once. He did not seem bothered that children use computers to play games, since he thinks that they will move on to other computer programs. He also mentioned that he was not sure if the center will be self-sustaining but with the daily income of 150 baht, the center should be successful. He would also like to expand the center by adding additional computers and other academic resources.

Our second interview in Huay King was with a primary school teacher who serves as a caretaker and encourages his students to use the center. According to the teacher, children are the first priority of the center, though he would like to see all the villagers using the center. He informed us that most students use the center for chat programs and games, but he has been trying to encourage them to use the Internet for other purposes, such as research and email.

In his opinion, the center is accessible and affordable to everyone. The location of the center is very convenient because the center resources can be used for educational purposes. The minimum daily income of the center is 45 baht and the maximum is 225 baht averaging the daily income to be approximately 150 baht. Students as well as villagers are very excited and

appreciate having the center in their village. He informed us that he did not mind children playing computer games because once they learn to use other computer programs, they will not spend all their time playing games. He recommended that the center should acquire newspapers, computer books, more computers, and more videos. He commented that the IT Center was a good idea because incorporating new technologies in a village will help the village grow. The center helps villagers keep up to date with the rest of the world and students will be able to expand their knowledge by Internet research.

4.5.2 Survey Details and Changes

In Huay King we surveyed 85 villagers of which 61 were students. 56 used the center for Internet, chat programs, email, and games. Apart from students, only 12 villagers used the center out of the 24 surveyed. Table 5 shows the breakdown of number of users by occupation and the results are plotted in Figure 12.

Occupation	# Surveyed	% Surveyed	# Users	% Users
Student	61	71.76%	52	81.25%
Farmer	4	4.71%	3	4.69%
Laborer	7	8.24%	3	4.69%
Housewife	4	4.71%	1	1.56%
Merchant	2	2.35%	1	1.56%
Government	2	2.35%	2	3.13%
Monk	1	1.18%	1	1.56%
Other	4	4.71%	1	1.56%
Total	85	100.00%	64	100.00%

Table 5: Breakdown of users by Occupation in Huay King.
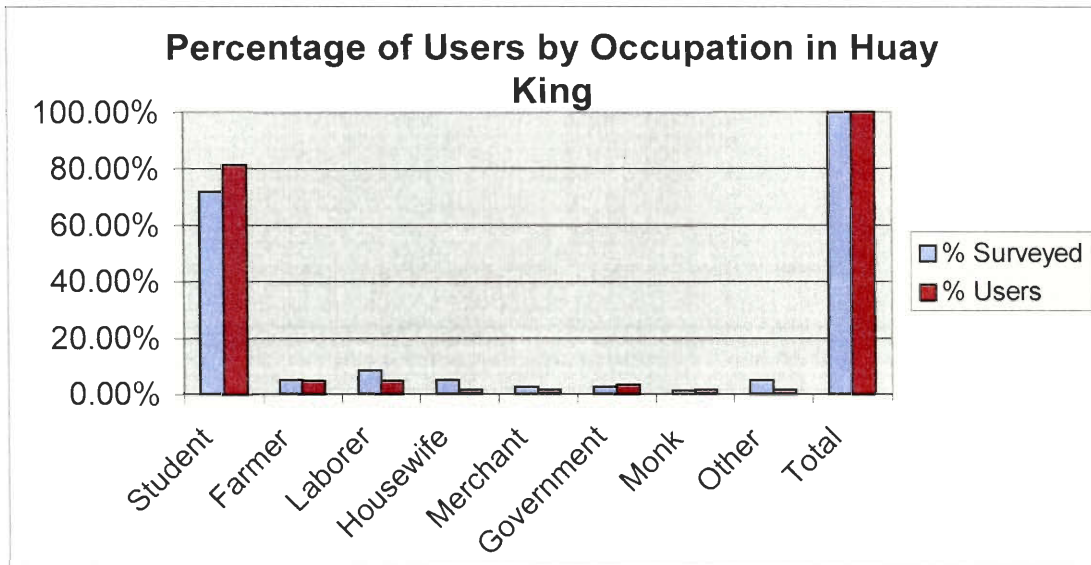
Figure 12: Breakdown of Users by Occupation in Huay King
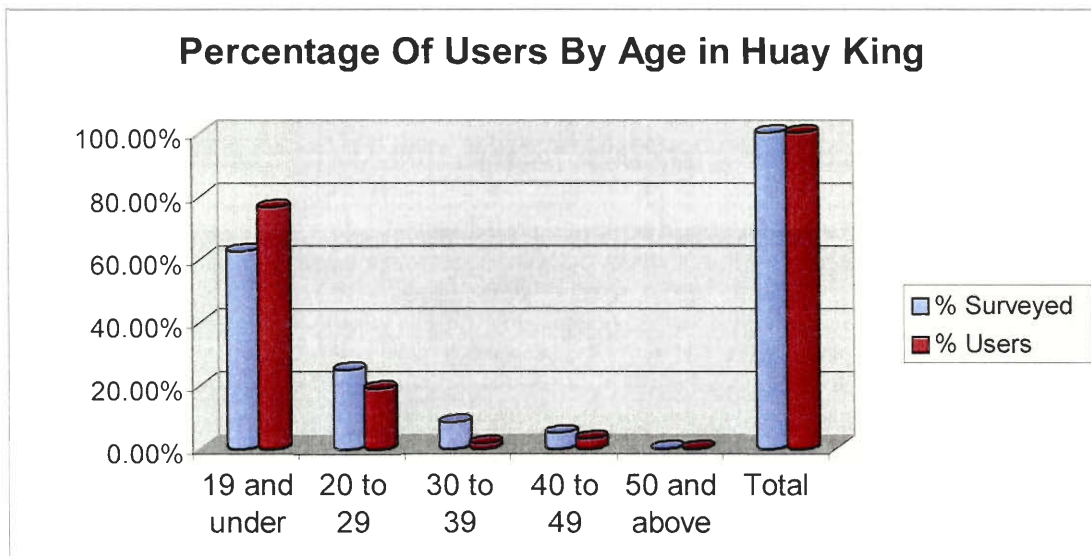
Figure 13: Breakdown of users by Age in Huay King Village.

4.5.3   IT Center Logs

Unlike the other three villages, we didn't have any information on the age or gender of the users because we were unable to get a copy of the Huay King IT Center logs.

5.   Analysis

The previous chapter presented all of the team's collected data. This chapter provides the analysis of these results from surveys, interviews, personal observations, and the data collected from the IT Center logs.

There are three parts to this analysis. The first section discusses each village individually with an assessment of whether or not the center is accessible and sustainable, and why. The next part was a comparison of the villages, where differences and similarities in the centers in each village are examined. This portion of our analysis also reflected on the differences in each villages' reaction to the technology and information offered by the IT Centers and how those differences might relate to access to technology. The third analysis is an examination of the tools we used to analyze the centers, namely our survey and interview questions.

5.1   Village Assessments

We have combined data from every source in order to assess the IT Center in each village. We applied the assessment described in our methodology in order to quantify our analysis and determine if each center was both accessible and sustainable.

We assigned weights to each of the criteria on a 1 to 5 scale, where 1 represented the least important criteria and 5 represented the most important. In order to determine how to weigh each of the factors, the four members of the group each developed their own set of weights based on how important we felt each factor was in determining accessibility or sustainability. We then met as a group and compared our weights. We took each member's weights into consideration and discussed each factor until we came to a consensus on the relative weights. These weights are presented in Table 6: Assessment Criteria Relative Weights.

Accessibility	Weight
Location	2
Availability of computers	3
Computer Literacy	5
Affordability	5
Internet Connection	4
Sustainability	
Current Center Income	5
Number of Users	3
Potential Increase in Number of Users	3
Quality of Service	2
Exclusive Market	4

Table 6: Assessment Criteria Relative Weights

We generated the actual values for each center in a similar method. After collecting all of our results from interviews, surveys, IT Center logs, and our observations, as well as studying some charts and graphs of our results, each group member rated the four centers based on the aforementioned criteria, and assigned a value of 1 to 5. Once again, we gathered as a group and discussed each of our ratings until we agreed on each rating for each center. We followed our methodology in order to generate the overall numeric assessment of each center. The overall ratings are shown in Figure 14: Relative Accessibility and Sustainability of Each Center.
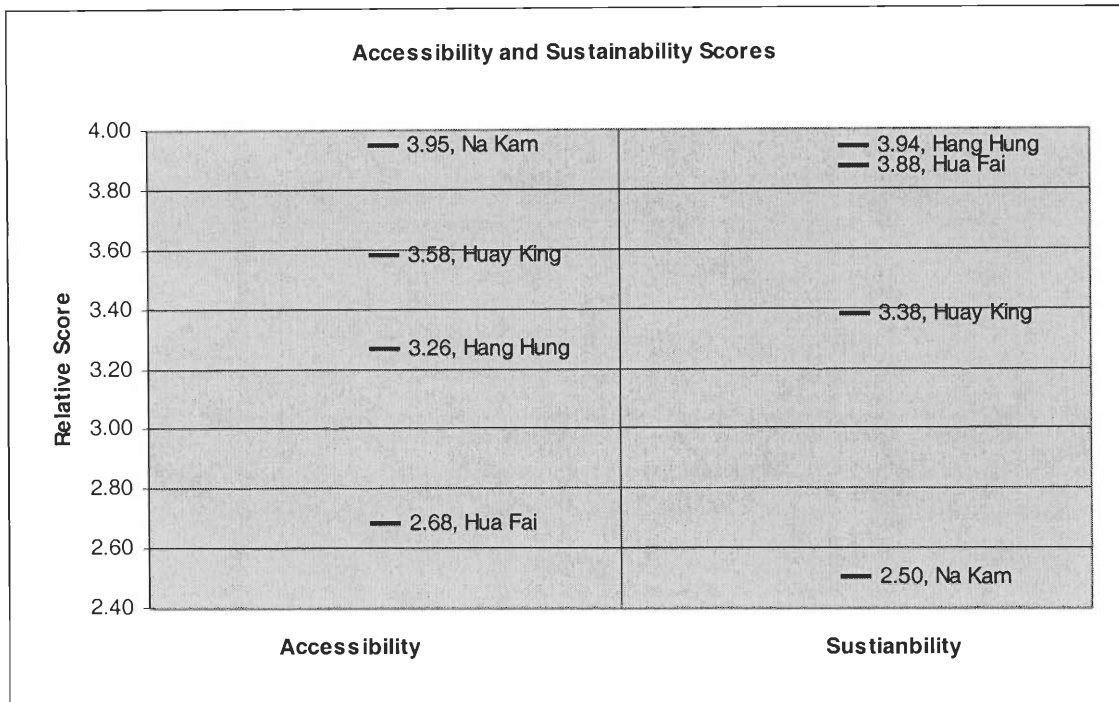
Figure 14: Relative Accessibility and Sustainability of Each Center

The above chart illustrates scores of each village relative to one another. The following sections detail the values that we assigned to each criteria in order to generate the weighted values in the table.

5.1.1   Hang Hung

Our data and observations show that the IT Center in Hang Hung will be a success. The village head as well as the villagers are very excited and motivated by the center. Only a couple households have computers at home, and the center is being mostly used for Internet. This village is fortunate because its center is funded by the Canadian Information Development Association (CIDA) and has more equipment than the other three villages, namely a facsimile and photocopier. Since the center is mostly used by children playing games in the afternoon, Khun Khao (village head) and Ms. Anong, the center operator, believe that the center could benefit from more computers so that the other users don't have to wait in line. The information about the center's income indicates that the center is sustainable and more people are beginning to use it because the villagers are excited to be connected to the Internet.

Our assessment scores are presented in Table 7: Assessment of Hang Hung.

Accessibility factor	
Location	4
Availability of computer	1
Computer Literacy	2
Affordability	5
Internet Connection	4
Sustainability factor	
Current Income	4
Number of users	5
Potential increse in # of users	2
Quality of Service	4
Exclusive Market	4

Table 7: Assessment of Hang Hung

The accessibility factor for Hang Hung's IT Center was broken down into five categories, which are described as follows. The location of the center, which was near the village's temple towards the front of the village, did not seem to hinder too many residents from using it so we gave it a four out of five. Computer availability was a one out of five because every afternoon we observed so many students, some times as many as ten at a time, crowd the two computers in order to play games; this resulted in other residents not being able to use the computers. Computer literacy received a two out of five because there were some residents who knew how to use the computers for word processing and internet capabilities. There were very few villagers who were not able to afford any of the center's resources, so Hang Hung received a five for affordability. The center's Internet connection was relatively fast and rarely disconnected while we were there, so it received a four out of five.

The sustainability factor for Hang Hung's IT Center was broken down into five categories, which are described below. The daily income of the villager's of Hang Hung did not seem to affect the center's use, so it received a four out of five. Hang Hung's center was one of the most used, so it received a five out of five for number of users. The resources being in their current condition with only two computers, we did not expect a large increase in use in the near future, so the center received a two out of five for projected user increase. The quality of service was near excellent, so it received a four out of five for that category. There were no competing Internet cafes, few villagers who owned computers, and no villagers with internet access, so the center received a four out of five for the exclusive market category.

Our results also indicate that the center is accessible to most of the residents of the village. Responses from interviews assured us that the center is certainly affordable; however, they also mentioned that many villagers are not able to use the computers due to lack of knowledge. This relates to the second type of digital divide, where even though the equipment is available for everyone to use equally, only a select group has access to the technology because only a small group knows how to use the technology. This is comparable to providing a library of books but not teaching people to read or how to conduct research in the library. If this is not resolved in the long term, it will make the resources of the center inaccessible to those who lack the education necessary to use the computers.

5.1.2   Na Kam

Our study in Na Kam showed that the center was very different from the IT Centers in other villages because Na Kam is very different from the other villages. Na Kam is more urban and is almost three times larger than the other villages. The Internet connection is slower than Hang Hung and disconnects much more often. This is unexpected because Na Kam is closer to the telephone center. Table 8: Assessment of Na Kam shows our ratings of the center in Na Kam.

Accessibility factor	
Location	4
Availability of Computer	5
Computer Literacy	3
Affordability	5
Internet Connection	3
Sustainability factors	
Current Income	2
Number of Users	2
Potential Increase in Number of	5
Quality of Service	3
Exclusive Market	2

Table 8: Assessment of Na Kam

The location of Na Kam's IT Center was near the market, which appeared to be the heart of the village commercially, so it received a four out of five for location. There were few users, so a computer was often available, so the center received a five out of five for computer availability. Those users that did use the center seemed to know how to use most of the machine's programs, so the center received a three out of five for literacy. The center was

affordable to almost all residents, as was assured us in our interview with Na Kam's IT Center Committee. The internet connection of the center frequently disconnected or had difficulty connecting, so that category received a three out of five. According to our interview with the IT Center operator, the center currently collects a daily income that is only half of what is needed to be sustainable, so it receives a two out of five. The center had few users while we were there, so it received a two out of five. If our recommendations for offering training in computer use are undertaken, the number of users for the center could greatly increase, so the center received a five out of five in the projected increase category. The quality of service received a three out of five. The center has to compete with two Internet cafes and other villagers' personal computers and internet connections, so it received a two out of five for the exclusive market category.

In addition to the IT Center, the village also has two Internet Cafes, each with ten computers and faster internet connections. When users of the IT Center get frustrated with the slow connection, they will in most cases pay the premium to use one of the Internet Cafes. Our results indicate many reasons that the center has very low usage. Children use the Internet Cafes instead of the center because there are more computers, a better Internet connection, and air conditioning. In addition to the café, several villagers have computers with Internet access at home. Na Kam is also located close to Mae Moh Witaya (MMW), where students can use the Internet and computers without charge an hour before and an hour after school.

Ms. Kanjana, the center operator, told us that the center is not sustainable because the center doesn't have enough users and the center makes average of 50 baht per day, while the center has a goal of 100 baht per day in order to be sustainable. After interviewing the Women's Group, we found that the center can be sustainable if the Women's Group starts using it. Currently, a handful of members of the Women's Group use the center for word processing. If they were to hold a class to teach other women how to use computers and the Internet, the center would have significantly more users. The Women's group represents a large group of villagers because 80% of the women in Na Kam are members of the group.

The center is located in the center of the busiest part of town. This is a good location for most of the villagers. Because of Na Kam's size, the center is not physically accessible to some villagers at the far edges of the village.

5.1.3   Hua Fai

Hua Fai is the most remote village, and also has the lowest quality phone line and Internet connection. Connecting to the Internet took dozens of attempts, up to several hours. The villagers are very excited and motivated about the center, especially Internet access. Besides the computers at the center and at the primary school, there are virtually no computers in the village. Our analysis is summarized in Table 9: Assessment of Hua Fai.

Accessibility factor	
Location	4
Availability of Computer	3
Computer Literacy	2
Affordability	4
Internet Connection	1
Sustainability factors	
Current Income	5
Number of Users	3
Potential Increase in Number of	2
Quality of Service	2
Exclusive Market	5

Table 9: Assessment of Hua Fai

The location of the center was near the center of the village, so it received a four out of five. The availability of computers was fair, so the center received a three out of five. According to our observations, there seemed to be few users who knew how to use many of the computers' programs other than games, so the center received a two out of five. The center's services were affordable to many but not all of the residents of Hua Fai, so it received a four out of five. The center's internet connection is practically unusable and needs attention, so that category received a one out of five. Despite a lack of internet access, the center has the highest daily income of all of the villages, so it received a five out of five. The center's users seem to be primarily students, so the center received a three out of five. Unless the center's internet connection is fixed soon, we see little reason for the number of users to increase, so we gave the center a two out of five. The quality of service received a two out of five. There are no residents of Hua Fai who own computers connected to the Internet, so the center received a five out of five for exclusive market.

After reviewing the log books kept by Ms. Pom, the center operator, we realized that the center is mostly being used for word processing and printing because of the poor Internet

connection. While the team was in the village, one of the computers was out for repair so the center only had one computer available for users.

At our interview with Ms. Pom, she informed us that the center is making at least 10 baht per day and sometimes a maximum of 300 to 400 baht per day on some weekends. The center meets the 100 baht per day goal and is definitely sustainable, but it does not fulfill the goal of connecting the villagers to the Internet because of the slow connection and frequent disconnections.

5.1.4   Huay King

The current location of the center at the elementary school is suitable because one of the teachers serves as the center caretaker. In free time, he teaches interested students to use the Internet, specifically email. The students and other villagers are excited about the center and are eager to learn. Our ratings for this center are shown in Table 10: Assessment of Huay King.

Accessibility factor	
Location	5
Availability of Computer	2
Computer Literacy	3
Affordability	5
Internet Connection	3
Sustainability factors	
Current Income	4
Number of Users	4
Potential Increase in Number of	2
Quality of Service	3
Exclusive Market	3

Table 10: Assessment of Huay King

The location of Huay King's center, in the village's primary school, only seems to help the center in terms of income and accessibility, so it received a five out of five. However, because the center is so popular with students there are not always computers available, so we gave the center a two out of five in that category. Those residents who used the computers seemed able to use most of the programs available, so the center received a three out of five for computer literacy. The center is affordable to almost all residents, as we were assured by the village head, so it received a five out of five. The Internet connection was fair but not as good as Hang Hung, so it received a three out of five. The current income of the center is good but could

be better so we gave it a four out of five. The number of users is excellent but there could be more users other than students, so the center received a four out of five for number of users. The team saw little reason for the number of users to greatly increase in the future, so we gave the center a two out of five. The quality of service received a three out of five. The center does have to compete with a significant number of computers that residents own, so it received a three out of five for the exclusive market category.

According to Khun Sanun, the village head, the daily income of the center is approximately one hundred and fifty baht per day and, therefore, the center is sustainable. The villagers find the center affordable because it is cheaper than the other option of traveling to Na Kam for the internet café.

The center is physically accessible to the all of the villagers. The location in the primary school makes it especially accessible to students and others who regularly use the school's field for sports in the afternoon and weekends.

5.2 Village Comparisons

After analyzing each of the IT Centers individually, it is possible to compare and contrast the different IT Centers. By comparing the different centers, it is possible to determine why some may be more likely to succeed. It is also possible to determine if the centers can learn something from each other to make all of the centers more sustainable. It is also possible to speculate on the differences in each villages' reaction to the technology and information offered by the IT Centers and how those differences might relate to access to technology.

Hang Hung stood out among the villages because of its additional equipment. The facsimile and photocopier in the IT center were used frequently, and by a different group of people than normally use the IT Center for the computers. These additional resources were obviously useful for the villagers, and serve to draw more traffic to the IT Center.

Aside from the extra equipment in Hang Hung, all of the centers had identical equipment. However, the quality of the phone lines varied greatly from village to village. Depending on how remote the village was, the telephone line needed to be extended a greater distance. Longer lines introduce more noise, which in turn means that the more distant villages will have modems connecting at lower transfer speeds. The lower speeds were manageable everywhere except Hua Fai, where the phone line was of such poor quality that it sometimes took hours to connect.

The most unique village of the four is Na Kam. The village is very large and urban compared to the others. Na Kam is also unique because it is the only center that is not currently making enough income to sustain the center. In the other three villages, computers are a novelty to most, if not all villagers. No other village has any residents with Internet access in their home. For these reasons, the villagers in the other villagers were all excited to see relatively new technologies in the IT Centers. The villagers in Na Kam were not nearly as enthusiastic because there was not anything in the center that they did not already have physical access to.

Each village also had different opinions about the use of the center. All of the villages wanted to give the students in the village the same access to technology that students in cities have. In all villages, children wanted to use the computers for games. In Hang Hung, the committee accepted this because they felt that games help children to become familiar with computers, while they also produce income for the centers. Na Kam was the only village that expressed concern about the content of the games children play. They were opposed to most of the violence in computer games, but saw the advantage to educational and intellectual games that challenged the user to think. Hua Fai, on the other hand, was strongly opposed to games altogether. They felt that using a computer for games is a waste of both the computer as a resource and a waste of the child's time. They felt that the time children use to play games would be better used in a learning environment, and using a computer for constructive purposes.

The villages' different reactions to the use of the centers, in this case for gaming, can also point to differences in attitude among the four villages as related to access to technology. All leaders of all of the villages were concerned about game use, but Na Kam was the only village where the issue of concern was the content of such games. In the other three villages, the issue was whether the use of games would help or impede the knowledge and information that can come from the new technologies. In Na Kam, the residents already had access to these technologies, so the issue has become more focused on what kind of information children get from them and how it may affect their outlook. Throughout our conversation with the IT Center Committee of Na Kam, the members seemed to be more interested in the center as an alternative or additional resource of technology and information rather than the only resource of the village, and therefore seemed to be more focused on issues of content. It will be interesting to see how Na Kam develops this potential additional resource in the near future.

All of the villages are similar in that they have a large number of villagers with the potential to be users, but without the education necessary to use the computers. The IT Centers were designed to be accessible to everyone in the village, but so far are only physically accessible. The villagers need an affordable way to learn to use the computers in order for the centers to be more accessible. There is a possibility that this issue might begin to be solved by the women's union in Na Kam. If the union is able to start workshops to train members at little or no cost, the same method of training can be duplicated in the other villages and for all villagers, not just women.

5.3 Tools Assessment

Over the course of four weeks in Mae Moh, we conducted four evaluations in four villages. We conducted each of the evaluations slightly differently so that we could improve our evaluation method. Over the course of four weeks we made several major revisions to the design of the survey, the questions we asked, the mode of distribution, and the interview questions.

Our tools and methodology may be used again in the future to evaluate the centers in Mae Moh, or may serve as a basis for evaluating similar centers elsewhere. We analyzed the interview questions and the surveys, as well as our methodology to determine the accuracy of the results they yielded.

5.3.1 Interview Assessment

We originally started the evaluation with one set of five questions that we planned to ask everyone. We soon found out that many questions either did not apply to some interviewees or that the interviewees did not know the answers. Over the course of four weeks, we separated the questions into groups so that we would ask each type of interviewee only questions that applied to them. For example, the center operators knew little about the planning and the funding of the centers, and likewise, the committee knew little about the day-to-day users of the centers. The final set of questions that we felt was most effective is included in Appendix B: Stakeholder Interviews

5.3.2 Survey Assessment

Our survey underwent much more revision than our interview questions. The first version of our survey was laid out in two columns. It was printed in a small font and probably had some

typographical errors. When we distributed the first version of our survey in Hang Hung, we found that most people were confused by the questions we asked them. This is further supported by the fact that we had many inconsistencies in our survey results. We also found that in many cases, we would get answers in a form that did not make sense, such as a yes or no answer to an open ended question. All of these indicators mean that the people we surveyed did not understand what we were asking or because the survey was too complicated.

In addition, we found that certain words did not translate to Thai as we expected. For example, we never received a clear answer when we asked if the centers were affordable in the interviews, and on the surveys, many people did not respond to that question. We changed it to ask if the centers were expensive and got a much better response.

Based on our observations, the second revision of the survey was more effective. We reorganized the format of the survey so that we could use a larger font. We changed several of the questions so that they made more sense to the respondents. Some villagers seemed confused by the survey, but most seemed to understand. In addition, fewer surveys contained contradictory answers. We found that a few more words were not accurately translated, and we fixed them midway through conducting the survey. While the survey was more understandable, it looked unorganized and unprofessional. We revised the survey once again and grouped all of the yes/no questions into one block, with a column for yes and a column for no.

Our third evaluation went very smoothly and with very few confused villagers; however, we found that some of the answers were still inconsistent. Some people still responded that they did not use the centers, but that they used them several times per week. We solved this by moving the two questions so that they were next to each other and easier to understand.

The final survey was very effective. We administered the survey to a class of twelve year old students and observed that they all completed the survey without any questions. This indicates that the survey was relatively easy to understand. Conducting the survey ran smoothly because there was no need to try and explain the survey. All of these factors indicate that our final survey would be useful and easy to administer for future studies.

All four of our surveys and their results are presented in Appendix C: Villager Surveys.

5.3.3   Methodology Assessment

Our methods for conducting the interviews and surveys were also refined as the weeks went by. At first we expected to interview several individuals from the village committee at the same time. We soon found that this was unfeasible. We slightly modified our method so that we would interview the committee as one group. This allowed us to get more responses to our questions in less time.

Originally, we had planned to conduct all of our interviews in the daytime. We quickly found that evening was the best time for those we interviewed, our interpreter, and us. We also learned to expect delays and be prepared to have enough time even if we started late.

Our original plan for the surveys was to distribute them in the IT Center, and to survey villagers around the village during the day. We found that we could get many responses in the IT centers, but there were not many villagers around during the day. We began conducting the surveys in the afternoon and evening and found there were many more villagers around.

We were concerned that we would not get a representative group of villagers by just walking around one part of the village. We resolved this by surveying at the primary school in the village. We surveyed the oldest class of students in the school because they were old enough to use the center themselves, they would know if their parents or siblings used the centers, and they represented the entire village.

Our final methodology is summarized in Appendix E: Future Methodology, and accompanied by our final survey and interview questions. Together, they can be used to conduct an evaluation of the Mae Moh IT Centers in the future or at another IT Center.

6. Lessons Learned

While living in the villages of Mae Moh district, we expected to eat "unusual" food since different regions of Thailand have different kinds of food. We also expected many villagers to have mixed feelings regarding our stay in their village. We soon found out that several villagers were excited to have foreigners living in their villages, but at the same time some residents seemed a bit resentful of our presence because they thought that we worked for EGAT. We did not expect anyone to speak English in the villages but there were a few people who were able to speak broken English.

What probably surprised us the most during our stay in Mae Moh was the overall friendliness of many of the residents. Part of this may have been due to the fact that we were foreign visitors, and that we were not accustomed to traditional Thai cultural standards where smiles are more expected.

Something should be said about culture shock. All of our project team members felt some form of culture shock, whether it was an overall feeling of surprise or more a feeling of disconnectedness from everyday life. These feelings are more likely to be produced in an environment where there are few people who speak your native language or have lifestyles very different from your own. There is not any way to "cure" culture shock, but most of these feelings of culture shock had worn off within the first week of our stay. However, a few of us found that some feelings of disconnectedness remained throughout the visit due to the large language barrier between us and the villagers.

There was much to be gained from living with families in Mae Moh. In addition to the valuable experience of living with a Thai family, staying in the villages helped our project. Living in the villages where our project took place gave us access to interviews, observations, and information that we would not have had if we had stayed in EGAT housing. For example, if we had lived in EGAT housing, which is located outside of all of the villages we were researching, we would have had to spend more time preparing and trying to get access to villagers for interviews and surveys. However, because we lived in these villages, we could focus more on our actual project.

7.   Conclusions and Recommendations

Our results and analysis have led us to several conclusions about the IT Centers, both as a group and as individual centers. We have determined the overall sustainability and accessibility of each center. We have also indicated several possible ways to improve the sustainability and accessibility of the centers as well as possible future studies and research related to the topics raised by our research.

We have found that every center has the potential to be sustainable. Our analysis leads us to believe that every village also has the potential to have an increasing number of users in the future. We feel that the Hang Hung, Hua Fai, and Huay King centers are currently sustainable. The IT Center in Na Kam is currently not sustainable, but depending on what measures are taken to increase its number of users, the center could become sustainable. We also found that the centers are currently accessible to everyone in the village because they are affordable for practically every resident and because many people consider the expense to be worth the cost.

As mentioned earlier in our report, there are two types of a digital divide. The first is simply a difference in access to technology; the second is a difference in education and familiarity with technology. Currently, the vast majority of users of the centers are students. Similarly, students are the only villagers who currently receive any sort of computer education. Our results point to a trend in the communities of the Mae Moh District that indicates that a local digital divide appears to be forming between residents. We therefore concluded that villagers over thirty years of age should be targeted for recruitment as users.

Our evaluation techniques changed from village to village so it is hard to make conclusive judgments regarding this potential problem. Nevertheless, certain results indicated that villagers who were over thirty years old were underrepresented among users when compared to the total population surveyed. For example, according to Figure two of our results chapter, Hang Hung residents over thirty represented about forty percent of those surveyed, but only about twenty-five percent of those who were also users. Also, the logbook information, as illustrated in Figure 6 of the results chapter, indicates that users aged thirty and above represented a small proportion of the actual IT Center users. Villagers over thirty years old are represented similarly in the results of our evaluations in Na Kam, Hua Fai, and Huay King, as

found in Figure 8, Figure 10, Figure 11, and Figure 13 indicating a similar trend among users of the IT Centers in every village.

In order for the center to bridge the digital divide more effectively, it will be necessary in the near future to find a way to educate the villagers in the use of computers and the Internet. We touched on this topic during our interview with the Na Kam women's union. Many of the members of the women's union would like to use the center, but lack the training to do so. Members of the women's union regularly run craft or cooking workshops for other members at little or no cost. We recommend that they look into running workshops in order to teach practical computer use to other women in the village. This recommendation alone would make the center in Na Kam sustainable. If a similar type of training were provided to all members of all of the villages, every one of the IT Centers would help bridge the digital divide not only nationally but locally, and the centers would also become more sustainable. This is an important point that would be well served by further studies and projects related to the digital divide and IT Centers in Thailand and, particularly, the Mae Moh District.

Another issue which became apparent during our research which would make for an interesting study involves the differences in attitude and opinion about the use of the centers between the villages. For example, on the issue of the use of games in the IT Centers, Na Kam was the only village where the issue of concern was the content of games rather on the use or existence of games itself. Na Kam is also the most urbanized of all of the villages we visited, and the only one that had access to computers and the internet prior to the IT Center. The leaders of Na Kam are the only leaders which seemed to be so interested in the content of information accessed by the center and which treated the center as an additional resource of technology for the village community. In the future it would be interesting to research the affects that large differences in development and technological access between villages have on the development of different IT Centers in Mae Moh and elsewhere in Thailand and the world.

There is also another problem related to education that, if addressed, could benefit the centers. If the IT Center operator has more computer training, it would be easier for the operators to assist new users as they learn to use the computers. In addition, this could be supported with a larger library of books on computer and computer application use. If the operators had more

technical training, it would allow them to fix many small-scale computer problems which currently require reference to a technician.

There are also several smaller and more practical methods that can be undertaken sooner in order to increase the use of the centers. Many villagers are hesitant to use the IT Center because they are not familiar with computers or other services that the center provides. One possibility which has proved enormously effective for Internet Service Providers is to offer an introductory period of free service. This could be a free first hour of use that would allow them to try the computers and Internet themselves, and possibly find it entertaining, useful, or educational, and want to return. In order to promote villagers spreading the word about computers, the centers could also provide a free hour to anyone who brings a new user to the center. The loss from the free hour would quickly be made up by the number of new users the center receives. Also, in order to promote greater center use among current users, the center could give free hours to frequent users, such as one free hour for every 10 hours used.

Since we found that every afternoon, most of the centers were crowded with children playing games, we propose that purchasing a video game system could be the most worthwhile addition to the centers. A video game system could cost less than 4000 baht (100 USD), including games. Currently, the TV in each of the centers is rarely used, and therefore produces little income for the centers. A video game system would move gaming traffic from the computers, which have a long waiting line, to the TV. If the center charged 10 Baht an hour per person for video game use the cost of the system would be paid back in less than 3 months. This is assuming that up to four players can use a video game system at one time, and that the system will be used for more than an hour a day. Although a video game system would promote game use, it would also allow the computers to be used more for Internet access and other more educational programs. However, each village has to make the decision concerning whether or not they want to promote the IT Centers as a place for entertainment.

Aside from increasing the accessibility and sustainability of the centers, there are several other aspects that need to be considered. The quality of the phone line in all of the villages was poor. This was most apparent in Hua Fai, where a single connection to the internet could take up to two hours. The village's phone line was affected by a major signal loss, which was apparent from listening to the modem try to connect. From this observation we were able to conclude that

the phone line was not installed properly. The center is profitable as is, but is not fulfilling the promise of Internet access and connecting the village to information from around the world.

Overall, the IT Centers are an excellent addition and are very well received by the residents of all four villages. The centers are a significant step in closing the digital divide in Thailand on a local, national, and global scale. We feel that other villages in Thailand and around the world can benefit from constructing IT Centers, and that our evaluation method will be useful in order for them to evaluate such centers.

8.   Works Cited

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- Sunskai, Somsak. "Panel Affirms Decision to Shift Villages". Bangkok Post. 05/03/99.

Appendix A: Annotated Bibliography

Mae Moh Background

- **Cummings, Joe. Thailand: What to do in the Land of Wats. Oakland: Lonely Planet, 2001.**
  This source was not useful for our background research. This book serves it purpose as tourist information. Since Mae Moh District is in Lampang Province, I decided to consult this book. The only information this book contains on Lampang Province is tourist information. Pages 465-72.

- **Flatters, Frank. "Global and Regional Economic Change: Implications for Northern Thailand." TDRI Quarterly Review. Vol. 9(March 1994): 8-15.**
  This article emphasizes the importance of international trade and investment discusses the nature of recent developments in international and regional trading arrangements. It can be used as background information because it talks about economy changes in Northern Thailand.

- **Lampang (Province) Data Base:** http://52000.hypermart.net/main/english.htm
  Contains demographic information (in English) about the province.

- **Reference:00D009M**
  Title: An Assessment of Relocation Impacts in Mae Moh
  Student: Stephanie Janeczko
  Advisor: S.J. Weinenger
- **Reference:00D008I**
  Title: An Assessment of Impacts of Relocation in a Thai Village
  Authors: Justin Greenough and Stephanie Janeczko
  Advisor: S.J. Weinenger
  Both projects provide information pertaining to the stakeholder, EGAT, the Mae Moh District, and other useful references

- http://www.sawadee.com/
  Provides very general information and maps about almost all the different regions and provinces of Thailand (that would be of interest to tourists).

- **Davies, Ben. Discover Thailand. Berlitz Publishing Co., Oxford, 1993**
  Gives brief information about Lampang and Northern Thailand in the context of history and different cultures, which is important.

EGAT
- **Interactive Qualifying Project, Chulalongkorn University, College of Public Health. Completed: January/February 2000. Location: Bangkok/Lampang, Thailand**
  The Electricity Generating Authority of Thailand (EGAT) operates a high capacity coal-fired power plant in Mae Moh District, Thailand. In the past, EGAT relocated villagers for

developmental purposes. This project evaluated the impacts of the different types of relocation projects, and determined which, if any, would be acceptable in the future. In order to obtain the information necessary for such an evaluation, surveys were administered to over 400 villagers and supplemented with nine focus group interviews.

- **"EGAT Social Services." Electricity Generating Authority of Thailand**
  http://www.egat.or.th/english/social/social_services2.html
  This website is somewhat important to our background because it explains social project that EGAT has been involved with which in a way confusing. Some web sites state that villagers and farmers are against most of EGAT's projects but the details of EGAT's current projects seem impressive. EGAT's current projects include Community Relations Program, Master plan for Bamras Naradura Hospital, Design and construction of religious places and facilities, etc. This source can be helpful in finding out EGAT's purpose behind IT Centers in Mae Moh District.

- **Somsak Sunskai: "EGAT Told to Help Mae Moh Folk". Bangkok Post. 07 Feb. 1999.**
- **Somsak Sunskai: "Panel Affirms Decision to Shift Villages". Bangkok Post. 09 May 1999: main, 2.**
- **Somsak Sunskai: "U-turn on Relocation of Villagers". Bangkok Post. 01 Apr 1999: main, 2.**
  All three articles give good perspective of the nature of EGATs past involvement with Mae Moh and some of the controversy surrounding it.
- **Poona Antaseeda. "Nosebleeds Don't Lie." Bangkok Post. 17 Dec 2000**
- **Boonsong Kositchotethana. "EGAT Hopes to Mine for Lignite." Bangkok Post 05 Apr. 2000**
  Both Articles give ideas on what EGAT has been doing the past two years.

Power Plant

- **Energy information Administration, Thailand: Environmental Issues, July 2000.**
  www.eia.doe.gov
  Approximately 350 miles north of Bangkok, the area surrounding the Mae Moh thermal power plant complex has recorded a large number of deaths from heart failure and a high occurrence of chronic respiratory problems.

- **Response to Environmental Issues Through Official Development Assistance (ODA), July 1994. Japan's Environmental Cooperation**
  Flue-gas Desulphurization Plant for Mae Moh Power Plant (FY1993). By installing a flue-gas desulphurizer, this project is aimed at reducing sulfur dioxide discharge from the Mae Moh Thermal Power Station in northern Thailand.

- **B. Ratanasthien, G.C. Badulis Jr.*, and P. Thavornyurtikarn**, "Potential weathering characteristic of Mae Moh lignite and power plant waste." Lampang Thailand, Department of Geological Sciences**
  *Environmental Risk Assessment Program, Faculty of Science

**Department of Chemistry, Faculty of Science, Chiang Mai University.
Over 60 M tons of mine waste and 4 M tons of coal ash from the coal-fired power plant at
Mae Moh, Lampang, northern Thailand, are dumped in the mining area every year. They
are subjected to oxidation and weathering, prior to leaching by rain.

- **EGAT starts the operation of FGD for Mae Moh's last units. *EGAT NEWS RELASE.*
  Public Relations Division, 21 March 2000.**
  The Electricity Generating Authority of Thailand (EGAT) officially started operating the
  Flue Gas Desulphurization (FGD) system for Mae Moh Power Plant.
  To take care of air quality around the plant area, Units 4-13 have been all installed with
  FGD. For Units 1-3, they are not equipped with FGD due to their small generating capacity
  (225 MW); however these units use lignite with low content of sulfur to generate the
  electricity.

- **"Sulfur Dioxide Emitted From Mae Moh Power Plant Is Well Within Standard."**
  EGAT News Release. http://pr.egat.or.th/english/news2.html
  This website is not a good source for our background because even though it talks about
  the power plant in Mae Moh, the article concentrates on how EGAT can control the amount
  of sulfur dioxide emitted from Mae Moh Power Plant "as required by the Pollution Control
  Department while emphasizing the development of quality of life of local people and its
  environment."

- **Kachalee Kongrut, and Vasana Chinvarakorn. Editorial. Bangkok Post. 26 Dec. 1998:
  Outlook 1.**
  Gives a case of strong resident opposition to the construction of power plants in their
  communities (like what EGAT did).

Digital Divide

- **Reference:01D024I**
  Title: The Digital Divide in Worcester
  Authors: Corey Caplette, Yakov Kronrod, and David Mills
  Advisor: M.R. Stevens
  This project can provide information pertaining to global digital divides and methods of
  measuring/evaluating such divides

- **Crispin, Shawn W. March 8, 2001. "Digitizing a Nation." Thailand, Bangkok.
  Journal: Far Eastern Economic Review.**
  This overview on the e-commerce of Thailand and its down sloping progress this last year
  focuses the importance and new Polices for the IT centers given by the government. The
  government promises to wire every district –rural and urban—with at least one Internet
  connection, planning to incorporate to the web 10 million Thais by 2004. It also explains
  the CAT's (Communication Authority of Thailand) monopoly situation and its impact on
  the digital divide. A possible solution to the CAT's implanted costs to users is an oligopoly.

- **Crispin, Shawn W. May 4, 2000. "Local Lingo." Thailand, Bangkok. Journal: Far Eastern Economic Review.**
  The Asians would prefer to surf the web on their own language, and it is already a reality. AD Venture Companies has supplied cash and counsel to over 15 Internet start-ups, most of which provide content in Thai. So this situation amplifies the issue of language barriers when using the Internet. One barrier is broken for the Thais that don't speak English and can't get much from the web. And another barriers are building between the outside world and the Thais. But this still helps the progress when ones concentrate on a digital divide issue.

- **Crispin, Shawn W. September 21, 2000. "E-commerce Emasculated." Thailand, Bangkok. Journal: Far Eastern Economic Review.** This article says that Thailand is on the wrong side of the digital divide and a rigid state monopoly is mostly to blame. CAT is charging customers about 5 times more than what the Internet service costs in Japan or Honk Kong. While some Internet entrepreneurs in Thailand says that the government directs the Internet in ways that only feed its own interests, CAT says that they don't want to make a profit, they need just enough margin to upgrade their system and give enough back to the government to help developed communication in rural areas.

- **Simpson, Rosie. "The Internet and Regional Australia: How rural communities can address the impact of the Internet." Rural Industries Research and Development Corporation, June 2001.**
  This report contains several case studies on the affect of introducing the internet to rural communities has on the digital divide in the community. The study methods in these case studies will be especially useful in our research.

- **Government Leadership and the Digital Divide. Gartner Group: April 2001**
  This document summarizes the findings of a Gartner group study on the Digital Divide in the United States. This is useful for its definition of the digital divide and its methods of measuring the divide.

- **Best Practices for Overcoming the Digital Divide (COM-13-3435). Gartner Group: February 2001.**
  This report details several steps the government can take to overcome the digital divide in the US. This will be helpful in guiding us to recommend solutions to digital divide problems we may encounter or observe.

- http://www.digitaldivide.gov/ **US Department of Commerce: National Telecommunications and Information Administration. 16 October 2000**.
  This website gives information about the digital divide in the United States, as well as steps the commerce department is taking to resolve them

- **http://www.digitaldividenetwork.org. Benton Foundation. Current website.**
  This is the website for the Digital Divide Network, a nonprofit organization with several corporate sponsors that studies the digital divide and how to resolve it. The organization

funds digital divide research, as well as provides several sources of information about the digital divide.

Uses of Technology

- **Falvey, J. L. "Sustainable Technologies in Thai Agriculture." ATSE Focus. 115(January 2001).** http://www.atse.org.au/publications/focus/focus-falvey3.htm
  This will be a useful website because it discusses agricultural technologies that have been practiced in Thailand. Even though, the article does not mention computer technology, I still believe that this website will be a good background information for social implications and impact of technology. Another reason this website is a good source because it lists more than 10 other resources which our team will able to consult.

- **Interview, Hilda K. Weisburg, Director and Head Librarian, Morristown High School Media Center, Morristown, NJ.** Conducted by phone on 12/19/01 by Joseph FitzPatrick
  This interview gave us information about how internet access was adopted in a US high school. It let us know more about how training was carried out, and how the library has evolved as a result in the following 4 years.

- **Crispin, Shawn W. May 11, 2000. "More secure, less free."** *Thailand, Bangkok. Journal: Far Eastern Economic Review.*
  The Narcotics Suppression Bureau is tapping Internet communications of those who are suspects. Thai laws governing the web are still undeveloped, but hacking into e-mail and e-commerce orders violates privacy laws protection in the country's new constitution. This situation brings new issues to those who were considering investing in e-commerce in Thailand. I did not find this article very useful for our purposes, but it does give us a more general view of the Internet In Thailand.

- **McCarthy, Matt and Clark, Neil. "Global Networks and Adoption of the Web." Rural Industries Research and Development Corporation, March 2001.**
  This report has details about how rural communities go about adopting the web This will be useful because the communities we will study in Mae Moh will most likely be adopting the web in similar ways.

- **Stubbs, A.K., Et Al. "Personal Computers for Farmers: Current and Future Use." Rural Industries Research and Development Corporation, March 1998.**
  This report gives details on how farmers in rural Australia have put computers to use to benefit their farming. This may not be directly useful to our project, but it is a good example of how a group adopted the use of computers and technology.

Methodology (Surveys, Focus Groups, etc.)

- **Worchel, Stefan, Joel Cooper, George R. Goethals, and James M. Olson.** *Social Psychology.* **California: Thompson Learning, 2000. (p. 19)**
  This reference is useful because it presents on one hand the possible problems that can arise with a survey. Also, it points out the difference existing between relation and causation

among events. Although the survey gives us information about the relationship between events, it does not clearly tell us which event is the cause and which is the effect. One must keep this very important point in mind while analyzing the data collected from the surveys.

- **Fink, Arlene and Kosecoff, Jacqueline. How to Conduct Surveys: A Step-by-Step Guide.Beverly Hills: Sage Publications, c1985**

- **Fink, Arlene. How to Design Surveys. Thousand Oaks, Calif.: Sage Publications, c1995**

- **Raj,Des. The Design of Sample Surveys. New York: McGraw-Hill, c1972.**

- **Fink, Arlene. How to Report Surveys. Thousand Oaks, Calif.: Sage Publications, c1995**

- **" Bradburn, Norman M.Polls and Surveys: Understanding What They Tell Us. San Francisco: Jossey-Bass, 1988.**

- **" Frey, James H. How to Conduct Interviews by Telephone and in Person. Thousand Oaks, Calif.: Sage Publications, c1995.**

Appendix B: Stakeholder Interviews

We planned to interview at least one representative of each stakeholding group of the IT centers. Depending on the specific stakeholder being interviewed, we had to custom-tailor the questions we asked to get the answers we were looking for. For each village, we tried to interview the village head, IT Center operator, and the IT Center Committee. As we proceeded with the interviews, we observed that some questions had useful responses, while others turned out useless. We modified the set of questions we asked as we proceeded through our interviews.

The following are sample questions we asked each interviewee:

1. What part did you have in the planning of the IT centers? What could have been done differently in planning the centers?
2. What do you expect the centers to be used for most? Who will be the primary users?
3. What is your opinion on the location of the centers? The resources at the centers? The staff of the centers? How can they be improved?
4. What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
5. Do you have any other comments about the centers, or about your expectations for the centers?

The following are results from each interview. The results also contain the modified questions we asked each interviewee. In our first village, Hang Hung, we interviewed the village head, the center operator, as well as the center committee. However, in Na Kam, instead of interviewing the center committee and the village head separately, we held focus groups with the center committee and the Women's Union and interviewed the center operator. In Hua Fai, we interviewed the center operator, the village head, and the primary school English teacher. The English teacher was able to inform us on his opinion about the center and the technology available at the school. In Huay King, our last village, we interviewed the village head and a primary school teacher who served as a caretaker and encouraged his students to use the center.

Village 1: Hang Hung

Interviewee: Khun Khao (village head)
Date: January 22, 2002

What part did you have in the planning of the IT centers?
As a village and IT center committee head, Khun Khao and the district head went to the World Bank, got the prize, organized the center by making rules and setting up the committee.

What could have been done differently in planning the centers?
Would have more computers and bigger center. They need support from the Mae Moh fund but if they don't receive additional funding, they'll seek help from private organizations.

What did you expect the centers to be used for most? Who are the primary users? What do they use the centers for?
The centers are mostly used by teenagers to get connected to the outside world faster and be up to date with the world. She would like the villagers to use new technology so they can contact other people via email, phone, fax, etc. Villagers want to use the technology in the centers but don't know how to use it. The center needs a specialist to teach them to use these resources.

Are they accessible and affordable to everyone?
Centers are accessible to everyone and affordable (15 baht per hour) because it's cheaper than the city. The committee can't raise the price because income per household is low.

What is your opinion on the location of the centers?
The location is not suitable. It should be in the front of the village where everyone can see it and not the center of the village. It should also be in a bigger building with different "departments."

The resources at the centers? How can they be improved?
Resources are not good enough. They would like a library of books because the village doesn't have a libaray, a cabinet to store accounting books, but they don't have enough money. Would also like name brand computers and not the generic ones which the center currently has.

Do you think the centers are self-sustainable?
Hard to tell because since the center is funded by CEDA, CEDA says they get 50% of income generated by the center and the center keeps the other 50%. If the income is less than expected and doesn't meet CEDA's goal, they'll take the income as well as all the equipment back. Since the server is very slow and keeps on disconnecting, the center is not making as much income as expected by the committee.

What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
Greatest praise is that the villagers now have a way to be connected to the outside world and teenagers can be up to date with the city. Greatest complaint is villagers actually want to use the computers but since there aren't enough computers, they have to wait in a line.

What is your opinion on the computers mostly used for games?
Kids don't really know how to use other programs in the computer. They are only familiar with games. Someone needs to guide them in the right direction and teach and tell them about other programs of the computer. Some villagers who know how to use the computer are not able to teach the children because they're not trained to teach.

How do you encourage older people to use the center?
In order to encourage older people, she needs to have a IT center training course for the elders.

What reference sources do you have other than the internet? (i.e. CD-ROM encyclopedia, etc.)
Currently, the center only has a TV/VCR and video rental but would like a library of books but again no money.

What do you think about expanding the center in other ways? (i.e. newspapers, library of books, VCD rental, video games)
The committee wants to expand the center by adding additional resources but the center doesn't have enough money. The committee is thinking about asking EGAT but the only problem with that is EGAT would have to give funds to all 4 centers. CEDA at first said they'll provide everything needed by the committee but now they're giving less.

Suggestions by the Team
Since the computers are mostly being used for games and there aren't enough computers, the team suggested buying a Sony Play Station for the TV. This way, 4 kids can plays video games and would free up the computers so other users wouldn't have to wait in line. Since the center doesn't have enough funds, the committee can write a letter to Sony asking for a donation of a Play Station for the IT Center.

Interviewee: Anong Tasueb (center operator)
Date: January 20, 2002

What part did you have in the planning of the IT centers?
Not much part in the planning of the center but as a center operator, she keeps a record of the users, their name, age, and what machine is being used and for what. She also needs to buy supplies and send a report and center income every 7 days to Khun Kaew (village and IT center committee head) as well as keep the center clean.

What could have been done differently in planning the centers?
If the center didn't have limited funding, she would have like to have more computers, air conditioner, cabinet to keep documents and accounting books, as well as a bigger library of videos.

What did you expect the centers to be used for most? Who are the primary users? What do they use the centers for? Are they accessible and affordable to everyone?
The center is used by everyone but mostly teenagers. Teenagers use the internet to be up to date with the rest of the world and for research and information which they can't get from other village resources. The center is affordable to everyone and accessible.

What is your opinion on the location of the centers? How can they be improved?
The location is ok but it would be better if it was in the front of the village.

The resources at the centers?
Not enough resources; would like a library of books because the village doesn't have a library as well as newspapers. The available resources have so many problems:
Copier doesn't work well
Fax works fine
Computers crash twice a week
Slow server, keeps on disconnecting
Not able to repair these problems.

The staff of the centers?
Only 2 persons manage the center (her and Khun Khao). No one else from the center committee cares enough.

Do you think the centers are self-sustainable?
The centers are making at least 100 baht a day and maximum 200 baht a day. The center can go on.

What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
The greatest praise is that the villagers are introduced to technology. The greatest complaint is kids dirty the floor, run in and out, and make a lot of noisy. When they want to play games, they bother users asking the users to get off the computers so they can play. They need to be taught how to use computers.

Do you have any other comments about the centers, or about your expectations for the centers?
Not enough security. Need electricity outside of the center. Need more computers.
Expectations: VCD player, VCD for rent, laser printer, and faster internet.

Has every single user been recorded in the books?
Every user has to write name so she can compare to see who's the most frequent user.

Suggestions by the Team
Since the older people have never been on internet, give them a trial hour for free then they'll come back. Buy a video game to free up the computers. Give 1 hour free for every 10 hours used.

Interviewee: IT Center Committee
Date: January 20, 2002

What did you expect the centers to be used for most? Who are the primary users? What do they use the centers for?
The center is used by everyone but mostly teenagers. Teenagers use the internet to be up to date as the city. This is the basic technology they can learn before going to a city.

Are they accessible and affordable to everyone?
The center is accessible to everyone and affordable. The price is lower than the city and 10 baht would be too low. The committee believes that if the price is too low, the villagers might think it's not worth using the technology.

What is your opinion on the location of the centers?
The location is suitable, because all activities take place in the center of the village.

The resources at the centers?
They're satisfied with the resources available for now since the center just opened but in the future, they would like to see an IT specialist to teach villagers, more computers, book shelves, and a small library.

The staff of the centers?
The staff is not trained enough. Lack of computer knowledge enables them from doing certain jobs such as fixing small technical problems. (For now, the committee sees this as a minor problem)

What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
Greatest praise is that the villagers can now "communicate" faster; i.e. fax, phone, internet, etc. The greatest complaint is there aren't enough computers.

Do you have any other comments about the centers, or about your expectations for the centers?
The major problem is money and government rules. If they ask for government funds, it would take years. Their best bet is to seek funds from private organizations.

Village 2: Na Kam

Interviewee: Kanjana Somwong (center operator)
Date: January 28, 2002

What part did you have in the planning of the IT centers?
None.

What did you expect the centers to be used for most? Who are the primary users? What do they use the centers for? Are they accessible and affordable to everyone?
The center is used by everyone but mostly teenagers. Teenagers use the internet and chat programs. Children usually use the computers to play games. Center is accessible and affordable to everyone. Since it's cheaper than the Internet Cafes, villagers want to use the center but there aren't enough computers.

What is your opinion on the location of the centers? How can they be improved?
The center should be closer to the road and in open view so that people can see it. They also need a sign for the center.

The resources at the centers?
The generic brand computers (Athena) and printer (Lexmark 232) do not work well. If there is a problem with the computers, she does not know how to fix it. There are many complaints about the computers. The IT Center was not ready yet when it opened, and its tables and chairs are borrowed from the committee. The center does not own anything. There is also no security for the center except for one lock.

Do you think the centers are self-sustainable?
The center averages about fifty baht a day because very few people use it, so the center is not really sustainable.

What is your greatest praise of the centers? Your greatest complaint?
Greatest complaint is that the there aren't enough computers. She would like to see name brand machines like Dell, but not Athena. The internet disconnections are a problem, since users will go somewhere else if it cannot connect to the internet.
Do you have any other comments about the centers, or about your expectations for the centers?
She would like to see additional resources in the center, such as newspapers, books, VCD rental, scanner, copier, laser printer, and more computers. Also, most people in Na Kam have computers at home.

Interviewee: IT Center Committee
Date: January 30, 2002

What did you expect the centers to be used for most? Who are the primary users? What do they use the centers for? Are they accessible and affordable to everyone?
They need people who know what it is and to spread the word about its usefulness. The center is not too expensive, but it would be better if they could make the center cheaper or a free service. Teenagers are the most frequent users, and they use the center for research for school work. They would like for all age groups to at least try to use the center. The committee does not like the idea of kids using the center only to play games.

What is your opinion on the location of the centers? The resources at the centers?
The location is good, but they need an individual building, since many activities take place in the same building. There are not enough computers and the low quality internet connection causes problems, since users may decide to use the internet cafes instead. If there is enough funding, they would like to expand the center to have more computers. The center does not seem to be self-sustainable, since they have to pay the operator five-thousand baht a month, when the monthly income is only two-thousand baht.

What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
The community does not seem to care much about the center, even though they have made announcements. The greatest complaint is that the internet connection is poor quality, and there are not enough computers.

What are your opinions on the existing two Internet Cafes in your village and their effect on the IT center?
The center has to compete with the internet cafes. If there were more computers, higher quality, and a better connection, IT Center users will feel more comfortable and won't have to waste time connecting to the internet. The center should have at least five computers to bring enough income to be self-sustainable.

Who provided the funding for this project (4 IT Centers)?
World Bank gave a grant of one million seven and EGAT gave a grant of 400,000 baht.

Interviewee: Women's Union
Date: February 11, 2002

What does the women's group do? How many members?
The Women's Union helps out at and supports village activities. They meet once a month, and often sell artificial flowers and supplementary work around the village. They have established a bank for the group and those who are interested. About 80% of Na Kam women are involved in the Union.

Do members of women's group use the IT Center? What do they use it for?
Some members of the Union use the IT Center for word processing to make schedules and other documents. They do not use the internet because they don't know much about it and don't know how to use it. They would like to use the internet the way the village of Tung Kluay does.

Would they like to use the center for anything else?
They do not need to use the center for anything else. They need announcements because not everyone knows about it.

Does the group help women learn to use computers?
The group does not help women to learn to use computers, but they plan on having a class to teach about computers at the center. Women want to learn to use the computers very much, but there is not enough time to.

Is the group trying to get their daughters involved?
The group tries to get their daughters involved, but most are busy with school.

How often do they meet?
Once a month.

Do you allow their children to use the computers? Do you think children learning internet is necessary and a good idea?
They allow their children to use the computers, but not for games so that they can learn other programs. Many kids have computers at home, but they want kids to realize how useful the internet is.

Do you have classes for other who want to learn how to sew, knit, cook, etc.?
The Union has many programs to teach women about sewing, flower making, cooking, and cosmetology. The programs have three different levels of basic, fashion , high for their sewing classes. Whenever they are free, they hold classes free of charge.

Village 3: Hua Fai

Interviewee: Mr. Dun Wongnai (village head)
Date: February 6, 2002

What part did you have in the planning of the IT centers?
Attended Mae Moh meeting with village heads from other 3 villages and Dr. Nuntavarn.

What could have been done differently in planning the centers?
The village head decides with the ITcenter committee since all the centers are independent from each other.

What did you expect the centers to be used for most? Who are the primary users? What do they use the centers for?
New village head, center was going to go in another village but there are less people.

Are they accessible and affordable to everyone?
Centers are accessible to everyone and affordable (15 baht per hour) because it's cheaper than the city. The committee can't raise the price because income per household is low.

What is your opinion on the location of the centers? The resources at the centers? How can they be improved? Do you think the center is self-sustainable?
The location is suitable. Resources are not good enough. Books about computers as well as newspaper. The IT Center should be successful.

What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
Greatest praise is that the center in the village is used as a meeting hall. (??) new building. Greatest complaint is the rm is too small as well as the building. Would like more and better computers.

What is your opinion on the computers mostly used for games?
The operator teaches the kids how to use the computers and Internet. People have to wait because kids are using the computers for games.

Interviewee: Ms. Pom (center operator)
Date: February 6, 2002

What part did you have in the planning of the IT centers?
Not much part in the planning of the center but as a center operator, she keeps a record of the users, their name, age, and what machine is being used and for what.

What could have been done differently in planning the centers?
The center needs a photocopier and a phone.

What did you expect the centers to be used for most? Who are the primary users? What do they use the centers for? Are they accessible and affordable to everyone?
The users are in the age group of 7 yrs to 40 yrs. Mostly used for games, internet (sometimes), and word processing. Yes to accessible, and affordable.

The resources at the centers? The staff of the centers?
Only 1 operator, would be nice to have some help. Not enough resources; Resources are not good enough. Books about computers as well as newspaper. The available resources have so many problems:
CPU is currently in repair
Computers crash twice a week
Slow server, keeps on disconnecting, hard to connect, sometimes 1 hour, at least 20 minutes. Not able to repair these problems.

Do you think the centers are self-sustainable?
Center's monthly income is around 2500 baht. The centers are making at least 10 baht a day and maximum 300 - 400 baht a day. The center can go on.

What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
The greatest complaint is building is too small and before the center was built, people used the school but ever since the building opened, they use that and gets very crowded.

Do you have any other comments about the centers, or about your expectations for the centers?
More people will use the center if the Internet connection was faster and if there were more computers for them to use because there aren't any computers in the villages or Internet.

Interviewee: Mr. Ton (Primary school English Teacher)
Date: February 6, 2002

How long have you been teaching at this school?
For 3 years.

Is there a computer class in this school?
There is no class but the school has 2 computers which the students use for playing games. Almost no one in Hua Fai has a computer at home so children enjoy using the school computers. Students would really like it if they had computer classes so they can learn about something other than the games.

Do you think the IT Center is a good idea and if the students use it?
It's an excellent idea and children use it to play games because they don't know how to use any other programs. Games are a basic tool to use computers and once they learn other programs, they'll move up. It's necessary for the new generation.

Have you visited and used the center? How do you feel about the internet connection and the resources?
He has used the center for email and since the phone line is the biggest problem, the connection is very slow and often disconnects. There is only 1 public phone in the whole village. There is no internet connection in school. 2 computers are not enough for the center. It needs at least 4 to 5 computers and faster connection.
Do you have any other comments about the centers, or about your expectations for the centers?
They need resources like encyclopedia and more computer books. The high school has internet but the government doesn't find it necessary to have internet in primary schools.

Village 4: Huay King

Interviewee: Khun Sanun (village head)
Date: February 8, 2002

What part did you have in the planning of the IT centers?
He worked with Dr. Nuntavarn for the past six or seven years on this project. He told the villagers about the benefits of the centers, including how they will affect their lives, in order to persuade villagers to use the centers.

What did you expect the centers to be used for most? Who are the primary users? What do they use the centers for? Are they accessible and affordable to everyone?
He expected teenagers to use the centers most for study, research, and to learn more about the outside world. The center should be accessible to everyone, and is cheaper than what they would find in the city.

What is your opinion on the location of the centers? The resources at the centers? How can they be improved? The staff of the center?
The current location at the elementary school is the best possible for security reasons, and there is an experienced teacher who can serve as the center caretaker and encourage students to use it. The resources seem to be good enough, but he has not had time to ask the villagers. The center used to have an excellent operator, but she left to work for EGAT. The current operator is very new, but seems okay.

Do you think the centers are self-sustainable?
He was not sure if the center is sustainable. The daily income is around one-hundred and fifty or one-hundred and sixty baht, so it should be a success.

What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
Greatest Praise: He is satisfied about the centers. Greatest Complaint: That his advertisements of announcements and meetings have not reached all of the villagers.

What is your opinion on the computers mostly used for games?
He thought because of computer classes at school, most students know the basics of computers. He did not seem bothered that children use computers to play games, since he thinks that they will move on to learn about other computer programs.

Do you have any other comments about the centers, or about your expectations for the centers?
He would like the center to expand to include more computers, a copier machine, and a fax machine. He hoped that the center would become a great success and become a complete facility. However, they would need more money for continuation and expansion.

Interviewee: Primary school teacher (care taker of the center)
Date: February 15, 2002

Who are the primary users? What do they use the centers for? Are they accessible and affordable to everyone?
Children and teenagers are the primary users and use it for chat and computer games. He tries to encourage the students to use the internet and email. Villagers use the computers for internet. Even though the youth are the first priority, the center is open for everyone. The price is not expensive.

What is your opinion on the location of the centers? The resources of the center?
The location is the best possible because the center resources can be used for educational purposes.

Do you think the centers are self-sustainable?
With the amount of income that the center is making, the center should be a success.

What is your greatest praise of the centers? Your greatest complaint? Are these being addressed? If so, how?
No complaints. The villagers and current users appreciate and are proud to have the IT Center in their village.
What is the daily income of the center?
Minimum = 45 baht; maximum = 225 baht; average = 150 baht

How do you feel about children using the computers for playing games?
He would like children to use the center to expand their knowledge through internet and not play games as much. He has been teaching them to use the internet and other computer programs. He believes his teaching is successful because now many students prefer to internet over games.

What additional resources does the center need?
More computers, newspaper, computer books, and videos.

Do you think building an IT Center in Huay King was a good idea? How and why?
It was a good idea because when a new technology is introduced in a village, it helps the villagers to expand their knowledge.

Do you have any other comments about the center?
The room needs to be improved. It needs more ventilation because it gets too hot.

Appendix C: Villager Surveys

We conducted a different survey in each of the four villages we visited. We did this so that we could improve the survey based on feedback each week. Over the course of 4 weeks we were able to transform a survey which was complicated, hard to read, and in some cases, poorly translated into a simple, straightforward, well translated survey. The following four pages are the four surveys that we used in Hang Hung, Na Kam, Hua Fai, and Huay King, respectively.

The changes we made to the surveys are explained in our results chapter, and are evident when looking at the following surveys. After the samples of the surveys, we have also included the raw results of the surveys that we have compiled in a spreadsheet.

แบบสำรวจ โครงการ ศูนย์สารสนเทศชุมชน สะพานสู่ขุมความรู้โลก(Survey)

Hang Hung

1) อายุ (Age) _____ปี (year)   เพศ (Sex) _____ ชาย(male) _____หญิง(female)

   อาชีพ(Occupation) _____ **เกษตรกรรม**(farmer) _____**รับจ้างแรงงาน**(laborer)

   _____นักเรียน (student)   _____อื่นๆ ระบุ(other)_____

   การศึกษา(Education) _____ ประถม (Elementary School)

   _____ มัธยม (High School)_____ มหาวิทยาลัย (University)

2) ท่านเคยมาใช้ศูนย์สารสนเทศชุมชนนี้หรือไม่ (Have you used the IT center?)

   _____ เคย (ever)   _____ ไม่เคย(never)

   เพราะ(Why)_____

   ถ้าไม่เคย ให้ข้ามไปตอบข้อ 8(If you have not, skip to question 8)

3) โปรดกาเครื่องหมาย ✓ ข้อใดต่อไปนี้ที่ท่านเคยใช้อยู่แล้วก่อนที่จะมาใช้บริการที่ศูนย์

   สารสนเทศชุมชนแห่งนี้(Check all you had access to before the centers:)

4) ท่านมาใช้บริการอะไรที่ศูนย์นี้บ่อยที่สุด เรียงลำดับ 1-5

   ตามการใช้ จากมาก -น้อย (What do you use most in the center?

   Number them in order of importance.)

วิดีโอ(VCR/VDO)		
โทรศัพท์(phone)		
ใช้คอมพิวเตอร์พิมพ์งาน(computer- word processing)		
ใช้รับ-ส่ง อีเมล์(computer- email)		
ใช้ค้นคว้าข้อมูลเพื่อการศึกษา วิจัย(computer- research)		
ใช้เพื่อการซื้อขาย(computer- buy + sell)		
ใช้เพื่อติดตามข้อมูลข่าวสารทางราชการ(computer- gov't info)		
ใช้เพื่อเล่นเกมส์คอมพิวเตอร์(computer- games)		
ใช้เพื่อพิมพ์งาน(printer)		
ใช้เพื่อส่งแฟกส์ (fax machine)		
เพื่อถ่ายสำเนารูป(photocopy)		
อื่นๆระบุ (other) _____		

5) ท่านมาใช้ศูนย์สารสนเทศชุมชนแห่งนี้บ่อยเพียงใด_____ครั้ง/สัปดาห์

   (How often do you use the center?) _____time/week

6) สำหรับเยาวชน : ผู้ปกครองของท่านทราบเกี่ยวกับศูนย์อินเทอร์เน็ตนี้หรือไม่   (Children: Do your parents know you use the center?) _____ ทราบ (Yes)

   _____ ไม่ทราบ (No)

7) ท่านจะยังคงมาใช้ศูนย์อินเทอร์เน็ตแห่งนี้อีกหรือไม่ (Will you continue using the center?)

   _____ ใช่ (Yes) _____ ไม่ใช่ (No)

   _____ ไม่ทราบ (Don't know)

8) ท่านคิดว่าศูนย์แห่งนี้เป็นศูนย์ที่เพรียบพร้อมหรือไม่ (Do you find the center affordable?)

   _____ ทราบ (Yes) _____ ไม่ทราบ (No)

9) ท่านมีปัญหาอะไรบ้างในการมาใช้บริการที่ศูนย์แห่งนี้(Have you had any problems using the center?)

   _____

   _____

10) ท่านทราบได้อย่างไรว่ามีศูนย์สารสนเทศชุมชนแห่งนี้(How did you find out about the center?) _____

11) มีบุคคลในครอบครัวของท่านมาใช้บริการที่ศูนย์สารสนเทศชุมชนแห่งนี้ด้วยหรือไม่(Do other people in your family use it?) _____ บุตรหลาน (children)

   _____ ผู้ปกครอง (parents)

   _____ อื่นๆ (other)_____

Hang Hung Survey Results

Age	Sex	Occu	Edu	use?	Access before centers												use at centers												freq	par	cont	afford	problems	publication
					tv	ph	wo	em	res	buy	go	ga	pri	fax	co	oth	tv	ph	wo	em	res	buy	go	ga	pri	fax	co	oth	times/week					
18	f	f	e		1	1				1	1		1				1	1							1	1	1		1					saw
16	f	s	h		1	1				1	1		1				1	1							1	1	1		2				more com	saw
15	f	s	h			1	1	1		1	1							1	1	1					1	1					1	1	more com	sister
13	f	s	h	1			1	1	1	1	1							1	1	1					1	1			1	1	1	1		pa
10	m	s	e	1							1							1							1			1	2	1	1	1		
19	f	s	h	1			1					1					1					1			1		1	3	1	1		slow/disco	friend
13	f	s	h	1		1	1	1	1	1	1							1	1	1					1	1			3	1	1			parents
12	m	s	e	1							1							1							1	1			3	1	1	1		parents
18	f	s	h																													1		parents
16	f	s	h	1	1	1	1				1		1					1	1			1			1	1		1	2	1	1			ad
10	m	s	e	1							1															1			1	1	1	1		saw
10	f	s	e	1							1															1			1	1	1	1		saw
18	f	s	h	1	1	1	1	1			1	1					1	1										4	1	1	1	disconnec	kk
18	f	s	h	1	1		1				1			1			1		1			1	1	1				1	1	1			news
19	f	s	h	1	1	1	1	1	1		1	1	1				1	1	1			1	1					1	1	1	1		saw
17	m	s	h	1																									1	1	1		
16	f	s	h																															pa
17	f	s	h																															kk
13	f	s	h			1		1																										
19	f	s	h		1	1	1																											
18	m	s	h	1													1	1	1				1					1	1	1	1		
18	f	s	h	1		1											1	1					1					3	1	1	1	readengl	kk
18	m	s	h																															
12	f	s	e																												1		kk
18	f	s	h	1																								1	1	1	1		friend
25	f	l	u	1			1	1			1						1	1	1			1	1					2	1	1	1	slow	friend
22	f	merc	u	1			1	1	1		1	1		1			1	1							1	1		4	1	1	1		saw
26	f	l	h	1		1		1		1	1		1			1		1							1	1	1	2	1	1	1	morecomp	pa
25	f	s	u	1		1			1		1						1										1	1	1	1	1		
23	f		h																															
22	f	merc	u	1	1	1				1	1		1				1	1	1			1	1		1		1	4	1	1			saw
20	f	hous	h																												1		kk
29	f	l	e	1													1													1	1		kk
25	m	EGA	u	1													1	1	1	1		1						2	1	1	1	morecomp	kk
39	f	f	e																														

Hang Hung Survey Results

Age	Sex	Occ	Edu	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Note	Resp
32	f		h			1						1														far	
37	f	l	e	1																1	1	2	1	1	1		kk
36	f	l	h			1																	1	1	1		kk
39	m	l	h	1		1			1		1				1						1		1	1	1		kk
36	f	merc	h	1											1		1			1	1	2	1	1	1	morecomp	kk
37	m	o	u																								saw
32	f	house	e	1								1									1	1	1	1			kk
38	f	merc	u	1		1	1		1	1	1			1	1		1	1		1	1	2	1	1		morecomp	saw
34	f	merc	h	1	1	1	1		1	1	1	1		1	1	1				1	1	1	1	1		morecomp	pa
33	f	housewife													1						1						
34	f	house	h	1					1	1			1		1	1	1				1	1		1		morecomp	pa
45	m	o	e	1											1							2	1	1	1		
42	f	house	e																		1	1	1	1	1		pa
45	f	house	e									1									1	1	1	1	1		pa
43	m	l	h	1												1					1	1	1	1			
41	f	l	e																			1	1	1			
49	m	l	e																							illiterate	
49	f	merc	h																				1				
43	f	l	e									1										1	1	1		kk	
44	m	l	h	1		1								1	1	1		1			1	5	1	1	1	morecomputers	
40	f	merc	u	1	1							1									1	1	1	1	1		kk
46	m		u	1							1	1	1	1	1				1	1	1		1		1		ad
50	f			1						1											1	1	1	1			
62	m	merc	h																				1				
55		o	e	1																1	1	1	1	1	1		saw
62	m	o	e	1																		1	1	1	1		saw
80	m	elder													1							1	1		1	old	kk
71	m	l	e																			2					
70	m	l	e																					1			

Technology Survey

1) **อายุ (Age)** _____ปี (year) **เพศ (Sex)** _____ ชาย(male) _____หญิง(female)

   อาชีพ(Occupation) _____ เกษตรกร (farmer) _____รับจ้างแรงงาน (laborer)

   _____นักเรียน (student) _____อื่นๆ ระบุ(other)_____

   การศึกษา(Education) _____ประถม (Elementary) _____ มัธยม (High school)

   _____มหาวิทยาลัย (University)

2) ท่านเคยมาใช้ศูนย์สารสนเทศชุมชนนี้หรือไม่ (Have you used the IT center?)

   _____ เคย (Yes) _____ ไม่เคย (No)

   เพราะ (Why ?)_____

   ~~ถ้าไม่เคยใช้ ข้ามไปตอบข้อ 6 (If you have not, skip to question 6)~~

3) ใส่เครื่องหมายถูกในช่องที่คุณใช้ทั้งหมด (Check all that you use:)

	บ้าน	งาน	โรงเรียน	ศูนย์กลาง	อื่นๆ
วิดีโอ(VCR/VDO)					
ใช้คอมพิวเตอร์พิมพ์งาน(computer- word processing)					
ใช้รับ-ส่ง อีเมล์(computer- email)					
ใช้ค้นคว้าข้อมูลเพื่อการศึกษา วิจัย(computer- research)					
ใช้เพื่อติดตามข้อมูลข่าวสารทางราชการ(computer-gov't)					
ใช้เพื่อเล่นเกมส์คอมพิวเตอร์(computer- games)					
ใช้เพื่อพิมพ์งาน(printer)					
อื่นๆระบุ (other) _____					

4) ท่านมาใช้ศูนย์สารสนเทศชุมชนแห่งนี้บ่อยเพียงใด_____ครั้ง/สัปดาห์

   (How often do you use the center?) _____hours/week

5) ท่านจะยังคงมาใช้ศูนย์อินเทอร์เน็ตแห่งนี้อีกหรือไม่ (Will you continue using the center?)

   ___ ใช่ (Yes) ___ ไม่ใช่ (No) ___ ไม่ทราบ (Don't know)

6) ท่านคิดว่าค่าบริการ ณ ศูนย์อินเตอร์เน็ตแห่งนี้แพงไปหรือไม่ (Is the center expensive?)

   ___ ใช่ (Yes) ___ ไม่ใช่ (No)

7) ผู้ปกครองของท่านใช้บริการของศูนย์อินเตอร์เน็ตนี้หรือไม่ (Do your parents use the center?)

   ___ ใช่ (Yes) ___ ไม่ใช่ (No)

8) บุตรหลานของท่านใช้บริการของศูนย์อินเตอร์เน็ตนี้หรือไม่ (Do your children use the center?)

   ___ ใช่ (Yes) ___ ไม่ใช่ (No)

9) ท่านมีปัญหาในการมาใช้บริการที่ศูนย์แห่งนี้หรือไม่ (Have you had any problems using the center?)

   ___ ใช่ (Yes) ___ ไม่ใช่ (No) Explain อย่างไร :

   _____

   _____

10) ท่านทราบเกี่ยวกับศูนย์สารสนเทศชุมชนแห่งนี้ได้อย่างไร (How did you find out about the center?)

   _____

Na Kam Survey Results

Age	sex	occupation	education	used?	vcr	word	ema	rese	govt	gam	print	othe	times/week	conti	exper	paren	kids?	problems	find out?
17	f	s	h	1	h	s		s		s	p		3					connection	friend
12	m	s	e		s	s	s	s	s	s									none
12	m	s	e	1	h	s	s	s	s	s	s		3		1				neighbor
11	m	s	e		h	s	s	s	s	s	s							not allowed	brother
14	f	s	e	1	h	i	i	i	s	i	i		3	1		1			PA
13	f	s	e	1	h	s	s	s	s	s	s		3	1			1		cousin
16	f	s	h	1	s	s	s	i	s	s	o		3	1			1		womens group,
18	m	s	h		h	h		s	s	h	h			1			1		PA
14	f	s	h	1	h	s		i		h	s		1	1			1		saw
8	f	s	e	1						i			2	1			1	doesn't know ho	friend
12	f	s	e		h	s	s	s	s	s	s							where?	none
17	f	s	h		h	h	h	h	h	h	h								saw
17	m	self emp.	h		h	h	i	h	h	h	i			1					PA
11	m	s	e		h	s	s	s	s	s	s								none
12	f	s	e		h	s	s	s	s	s	s							can't get there	PA, parents
12	f	s	e			s	s	s	s	s									none
12	f	s	e		h	s	s	s		s	s							can't get there	PA, parents
11	m	s	e		s	s	s	s	s	s	s	s						can't get there	friend
12	f	s	e		h	s	s	s	s	s	s								none
12	f	s	e		s	s	s	s	s	s	s								cousin
12	m	s	e		s	s	s	s	s	s	s								friend
12	f	s	e		h	s	s	s	s	s	s							doesn'n need to	none
11	f	s	e		h	s	s	s	s	s	s								brother
15	m	s	h		h	h	s			h	h			1					none
12	f	s	e		h	s	s	s	s	s	s								none
12	m	s	e		s	s	s	s	s	s	s		3		1	1		doesn't know wh	none
17	f	s	h												1				vh
14	f	s	h		h	h	h			h	h								
15	f	s	h	1	s	s	i	h	s	i	h		2	1		1			
18		s	h	1	h	s	s	s	s	h	h		4			1			
14	m	s	h	1	s	s	i		s	h	h		3	1		1	1		
15	f	s	h		h												1		PA
15	f	s	h	1	h	s	s	s	s	i	h	i	12	1	1		1		ad at school
14		s	h																
13	f	s	h	1	h	i	i	i	s	s	s		2				1		someone
18	f	s	h	1		i			i				1	1					PA
15	f	s	h	1	hi	i	i	i	i	h	i		12	1	1		1		ad at school
20	f	s	u	1		i	s		i	i			3	1					PA

Na Kam Survey Results

Age	Sex	Occupation	Edu		L1	L2	L3	L4	L5	L6	L7							Notes
22	m	o	u		i	i				i	i							none
26	m	merchant	u	1	h	h	i	i	i	h	h	1	1	1				PA
20	f	l	h		h	o	o	s	o	i	o	1	1			1		friend
20	m	l	h		h													friend
20	f	o	h		h	s	s	s	o	o	o		1			1		friend
25	f	merchant	h		h	s	s	i	i	h	s			1				
25	f	merchant	u	1	h	h	i	i	i	h	h	2	1		1	1		PA
22	f	l	u	1	o	o	o	o	o	o	o	1	1			1		PA
24	f		h		h	w	w	h	w	w	w							
29	f	o	h		h	o	o	o	o	o	o							
26	m	merchant	u		h	h	h	h		h	h		1			1		PA
22	f	merchant	u		h	s	o	o	s					1		1		VH
25	m	merchant	u	1	h	i	h	h	i	i	h	1	1			1		opening day
31	f	merchant	u		h	h	s	s		h	h		1		1	1		
32	m	l			i	s	w	s	i	s	h	1			1	1		saw
34	f	merchant	e		h				h				1				no time	
34	f	merchant	h		h	h	h	h	h	h	h	1						
39	f	housewife	h													1		friend
33	f		h		h											1		
39	m		h		h	h		h		h	h						far	none
34	m	l	h		h	w	w	w	w	w	w							none
33	f	l	e															
30	m	l	h		h													
33	m	l	h		h													none
33	f	merchant	u															none
34	m	doctor	u		h	h	h	h	h	h	h							none
38	f	merchant	h	1	h	s	i	i	i	i	i	2	1		1	1		
38	f		e									1	1	1	1			
30	f	hairdresser							h			1				1		
40	f	merchant	u		h													
40	f	merchant	u													1		none
41	m	l			h													
43	f	l	u	1						i		1						PA
40	f	merchant	u													1	far	saw
42	f		e		h	o			o	h						1		
40	f	housewife	college	1	h	h	i	i	i	i	h	2	1					member of com
43	f	teacher	u		s	s		s	s	s	s							none
65	m		u		h	o	o	o	o	o	o							

<u>แบบสอบถาม(Technology Survey)</u>

1) อายุ (Age) _____ ปี (year)   เพศ (Sex)   ____ ชาย(male) ____หญิง(female)

   อาชีพ(Occupation)   ____ เกษตรกร (farmer)   ____รับจ้างแรงงาน (laborer)

   _____นักเรียน (student)   ____อื่นๆ ระบุ(other)_____

   การศึกษา(Education)   ____ประถม (Elementary)   ____ มัธยม (High school)

   ____มหาวิทยาลัย (University)

2) ท่านมาใช้ศูนย์สารสนเทศชุมชนแห่งนี้บ่อยเพียงใด(How often do you use the center?)

   _____ครั้ง/สัปดาห์ (hours/week)

3) ใส่เครื่องหมายถูกในช่องที่คุณใช้ทั้งหมด (Check all that you use:)

	ที่บ้าน	ที่ทำงาน	โรงเรียน	ศูนย์ IT	อื่นๆ
วิดีโอ(VCR/VDO)					
ใช้คอมพิวเตอร์พิมพ์งาน(computer- Office)					
คอมพิวเตอร์-สนทนาอินเตอร์เน็ต(computer- chat Internet)					
ใช้รับ-ส่ง อีเมล์(computer- email)					
ใช้ค้นคว้าข้อมูลเพื่อการศึกษา วิจัย(computer- research)					
ใช้เพื่อติดตามข้อมูลข่าวสารทางราชการ(computer-gov't)					
ใช้เพื่อเล่นเกมส์คอมพิวเตอร์(computer- games)					
ใช้เพื่อพิมพ์งาน(printer)					
อื่นๆระบุ (other) _____					

	ใช้ (Yes)	ไม่ใช้ (No)	อื่นๆ (Explain)
4) ท่านเคยมาใช้ศูนย์สารสนเทศชุมชนนี้หรือไม่ (Have you used the IT center?)			
5) ท่านจะยังคงมาใช้ศูนย์อินเทอร์เน็ตแห่งนี้อีกหรือไม่ (Will you continue using the center?)			
6) ท่านคิดว่าค่าบริการ ณ ศูนย์อินเตอร์เน็ตแห่งนี้แพงไปหรือไม่ (Is the center expensive?)			
7) ผู้ปกครองของท่านใช้บริการของศูนย์อินเตอร์เน็ตนี้หรือไม่ (Do your parents use the center?)			
8) บุตรหลานของท่านใช้บริการของศูนย์อินเตอร์เน็ตนี้หรือไม่ (Do your children use the center?)			
9) ท่านมีปัญหาในการมาใช้บริการที่ศูนย์แห่งนี้หรือไม่ (Have you had any problems using the center?)			

10) ท่านทราบเกี่ยวกับศูนย์สารสนเทศชุมชนแห่งนี้ได้อย่างไร (How did you find out about the center?)

   _____

Hua Fai Survey Results

Age	Sex	Occup	Educati	hrs/wk	VCR	Off	chat	email	resea	govt	game	printer	other	Used?	continu	expens	parent	child u	problem	explain?
10	m	s	e		h	s					s			1	1				1	
10	m	s	e		h											1				
10	m	s	e	1	h						s			1	1				1	
10	m	s	e	1	h						s			1	1				1	
10	m	s			h,s	s														
10	f	s	e		h															
10	m	s	e	5	h		IT				IT			1	1					
11	f	s	e			s					s									
11	m	s	e	4	s						IT			1	1	1				
11	m	s	e	2	s	IT	IT	IT	s	s	IT	IT		1	1	1				
11	m	s		3	h	w	IT				s	s			1					
11	f	s	e	2	s	s	IT	IT	IT	IT	s	s			1			1		
11	f	s	e													1				
11		s	e	1	h	s	IT		IT	IT	s	s		1	1			1	1	
11	m	s	e		h						s			1	1	1	1		1	
11	m	s	e	5	h		IT				IT			1	1				1	
11	f	s	e		h															
11	f	s	e		h						h							1		
11	f	s	e		IT						IT			1	1					
11	f	s	e		h	s					h				1	1				
11	m	s	e		h						s									
11	f	s	e		h										1	1				
11	m	s	e		h						s				1	1				
11	f	s	e	1	h			h		IT	IT			1	1					
11	m	s	e		h						s				1	1	1		1	
11	f	s	e								s									
11	m	s	e		h	s					s							1		
11	f	s	e	2	s	s	IT	IT	s	IT	s	s			1				1	
11	f	s	e	2	s	s	IT	IT	IT	s	IT	s							1	
11	m	s	e		h												1		1	
12		s	e	2	h	s		s	IT	IT	s	s			1	1			1	
12	f	s	e	3	h	s	IT		s		s	s		1	1			1	1	
12	f	s	e	3	h	s	IT		s	s	s	s		1	1			1		
12	m	s	e	2	h						IT			1	1	1				
12	m	s	e	3	h				IT		s	s		1	1					
12	f	s	e	2	h	s	IT	IT	IT	IT	s			1	1	1		1	1	
12	f	s	e	2	IT	s	IT		s	s				1	1			1		
12	m	s	e	2	h	s	s		h	IT	IT			1	1					
12	m	s	e	2	s	s	s	IT	s	IT	IT	s		1	1			1		
12	m	s	e	2	h	s	s	s	h	s				1	1					

Hua Fai Survey Results

Age	Sex			Num														
12	m	s	e	2	s	s	s		s		s		1	1				
12	f	s	e	2	s	IT	IT	IT	IT	s	s			1				
12	f	s	e	2	s	s	IT	IT	s	s	s	s	1	1			1	
12	f	s	e	2	h	s	s	IT	IT	IT	s	s	1	1	1		1	
12	f	s	e	3	h	s		IT	s		IT	IT	1	1	1		1	
12	f	s	e	2	h	s	s	IT	IT	IT	s	s	1	1	1		1	
12	m	s	e	1	h	s	s	s	s	s	s	IT		1		1	1	
12	f	s	e	2	IT	s	IT			s	s		1	1		1		
12	f	s	e	7	h	s				h	h		1	1				
12	f	s	e	1	h					IT			1	1				
13	f	s	h	2	h	s		s	IT	IT	s	s	1	1			1	
13		s	h	2	h	s	IT	IT		IT	IT	IT	1	1			1	
13	m	s	h	2	h	s				IT	s	s	1	1			1	
13	m	s	h		h	s	s			s	IT	IT	1	1				
13	f	s	e	2	s	s	IT	IT	s	s	s	s	1	1		1	1	
14	f	s	h	2	s	s	s	s	IT	s	IT		1	1		1	1	
15	f	s	h	1	s	s	s	s	s	s	s	s	1	1			1	1
15	f	s	h	3	s	s	IT		s	s	IT		1	1			1	1
15	m	s	h	2	h	s	IT	s	w	IT	s	s	1	1			1	
15	m	s	h	1	h	s	IT	w	s	IT	s	s	1	1			1	
16	f	s	h	1	s	s	s	IT	s	s	s	s	1	1			1	1
16	f	s	h	3	h	w	IT	w	w	w	s	s	1	1			1	
16	f	s	h	2	s	s	s	s	s	s	s	s	1	1			1	1
17	f	s	h	3	s	s	s	s	s	s	s	s	1	1			1	
17	f	s	h	3	h	s	IT	w	s	IT	s	s	1	1			1	
18	f	s	h	1	h	s	IT	w	s	IT	s	s	1	1			1	
18	m	s	u	3	h	w	IT	w	w	w	s	s	1	1			1	
19	f	s	u	2	h	w	IT	w	IT	w	s	s	1	1			1	
19		s	u	4	h	s	w	s	IT	IT	s	s	1	1			1	
19	m	s	h	1	h	s	s	s	s	s	s	s	1	1			1	1
24	f	l		5	h	w	IT	w	IT	w	s	s	1	1			1	
26	m	l	u		h	w	s				w		1	1			1	
21	f	f	h	2						IT	IT		1	1		1	1	
23	f	s	u	2	h	w	IT	w	IT	w	s	s	1	1			1	
20	m	s	u	4	h	w	IT	w	IT	w	s	s	1	1			1	
27	f	s	u		h	w	IT	w	IT	w	s	s	1	1			1	
25	f	l		2	h	w	IT	w	IT	w	s	s	1	1			1	
21	m	s	u	2	h	w	IT	w	IT	w	s	s					1	
20	f	s	u	1	h	s	s	s	s	s	s	s						
21	m	s	u		h	s	s	s	s	s	s	s	1	1			1	
23	m	s	u	3	h	s	s	s	s	s	s	s	1	1			1	1

Hua Fai Survey Results

24	f	l	u		2	h	IT		s		w	IT	s		1	1				1	1
26		s	u		3	h	s	IT	w	s	IT	s	s		1	1				1	
24	m	s				w	s	w	s	IT	IT	s	s		1	1				1	
32	f		h		1	h														1	
33	f	m	h			h															
30	m	l	e			h											1				1	1
40	m	govt	u		3	h	h	h	h	h	h	h	h		1	1					
48	f		u		1	h	w			IT		IT			1	1	1				1
40	m		e			h	IT	IT	IT	IT	IT	IT	IT					1		1	
56																					

Huay King

<div align="center">

แบบสอบถาม(Technology Survey)

</div>

1) **อายุ (Age)** _____ปี (year)   **เพศ (Sex)** _____ ชาย(male) _____หญิง(female)

   อาชีพ(Occupation) _____ เกษตรกร (farmer)   _____รับจ้างแรงงาน (laborer)

   _____นักเรียน (student)   _____อื่นๆ ระบุ(other)_____

   การศึกษา(Education) _____ประถม (Elementary)   _____ มัธยม (High school)

   _____มหาวิทยาลัย (University)

2) ใส่เครื่องหมายถูกในช่องที่คุณใช้ทั้งหมด (Check all that you use:)

	ที่บ้าน	ที่ทำงาน	โรงเรียน	ศูนย์ IT	อื่นๆ
วิดีโอ(VCR/VDO)					
ใช้คอมพิวเตอร์พิมพ์งาน(computer- Office)					
คอมพิวเตอร์-สนทนาอินเตอร์เน็ต(computer- chat Internet)					
ใช้รับ-ส่ง อีเมล์(computer- email)					
ใช้ค้นคว้าข้อมูลเพื่อการศึกษา วิจัย(computer- research)					
ใช้เพื่อติดตามข้อมูลข่าวสารทางราชการ(computer-gov't)					
ใช้เพื่อเล่นเกมส์คอมพิวเตอร์(computer- games)					
ใช้เพื่อพิมพ์งาน(printer)					
อื่นๆระบุ (other) _____					

	ใช้ (Yes)	ไม่ใช้ (No)	อื่นๆ (Explain)
3) ท่านเคยมาใช้ศูนย์สารสนเทศชุมชนนี้หรือไม่ (Have you used the IT center?)			ชั่วโมง/สัปดาห์ _____ (hours/week)
4) ท่านจะยังคงมาใช้ศูนย์อินเทอร์เน็ตแห่งนี้อีกหรือไม่ (Will you continue using the center?)			
5) ท่านคิดว่าค่าบริการ ณ ศูนย์อินเตอร์เน็ตแห่งนี้แพงไปหรือไม่ (Is the center expensive?)			
6) ผู้ปกครองของท่านใช้บริการของศูนย์อินเตอร์เน็ตนี้หรือไม่ (Do your parents use the center?)			
7) บุตรหลานของท่านใช้บริการของศูนย์อินเตอร์เน็ตนี้หรือไม่ (Do your children use the center?)			
8) ท่านมีปัญหาในการมาใช้บริการที่ศูนย์แห่งนี้หรือไม่ (Have you had any problems using the center?)			

9) ท่านทราบเกี่ยวกับศูนย์สารสนเทศชุมชนแห่งนี้ได้อย่างไร (How did you find out about the center?)

_____

Huay King Survey Results

Age	Sex	Occupati	Educatio	VCR	M.Offi	Chat	email	reasea	Gov't	game	printer	other	Used?	Contin	exper	parent	Childr	probler	Hours/w	how?
10	f	s	e	h									1		1		1			VH
10	m	s	e	s	s	IT		s	IT	s	IT		1	1		1			5	pa
10	m	s	e							IT			1	1			1			
10	m	s	e	s						s,IT			1	1	1		1	1	7	operator
11	f	s	e	h									1		1		1			VH
11	f	s	e	s,it	s,IT	IT	it	it	s,it	s,IT	s,it		1	1					5	treache
11	f	s	e	s,it	s,IT	IT	it	it	s,it	s,IT	s,it		1	1					3	Teache
11	f	s	e	s,it	s,IT	IT	it	it		s,IT	s,it		1	1					4	VH
11	f	s	e	h,s,it	s,IT	s,it	it	it	s,it	s,IT	IT		1	1					5	VH
11	f	s	e	s,it	s,IT	IT	it	it		s,IT	s,it		1	1					5	VH
11	m	s	e		s,IT					s,IT	s,it		1	1		1				
11	m	s	e		it	it	it			it	it		1	1		1				
11	m	s	e	s,it	s,it	it	it	it	s,it	s,it	s,it		1	1		1			3	school
11	m	s	e	s,it	it	IT	it	it	s,it	IT	s,it		1	1		1			4	PA
11	m	s	e	h,s,it	s,IT	s,it	it	it	s,it	s,IT	IT		1	1		1			5	VH
11	m	s	e	s,it	s,IT	IT	it	it	s,it	s,IT	s,it		1	1		1			3	PA
11		s	e	h		s,it				s,it			1	1			1			
11		s	e					s		s			1	1	1					
12	f	s	e										1	1	1		1	1		VH
12	f	s	e	s,it	s,IT	s,it	it	it	s,it	l	s,it		1	1				1	3	school
12	f	s	e	s,it	s,IT	s,it	s,it	s,it		s,IT	s,it		1	1		1			5	school
12	f	s	e	s,it	s,IT	s,it	it	it	IT	s,IT	s,it		1	1		1			5	school
12	f	s	e	s,it	s,IT	s,it	it	s,it	IT	l	s,it		1	1					8	pa
12	f	s	e	s,it	s,IT	IT	it	it		s,IT	s,it		1	1					4	VH
12	m	s	e		s	s		s		s	s		1	1			1			
12	m	s	e	s,it	it	IT	it	it		l	l		1	1		1			4	PA
12	m	s	e	h,s,it	s,IT	IT	it	it	IT	l	l		1	1		1			8	PA
12	m	s	e	s,it	it	IT	it	it	IT	l	l		1	1		1			3	PA
12	m	s	e	s,it	it	IT	it	it		l	l		1	1		1			7	Brother
13	f	s	h	s	s	s	s	s	s	s	s			1						
13	f	s	e	s,it	s,IT	IT	it	it	IT	l	l		1	1		1			4	School
13	f	s	h	s,it	s,IT	IT	it	it	s,it	s,IT	l		1	1		1			5	PA
13	f	s	h	s,it	s,IT	IT	it	it	s,it	s,IT	s		1	1				1	6	School
14	f	s	h	h	s	s	s,it	s	s,it	s	s,it		1	1				1	7	Operator
14	m	s	h	s,it	s,IT	IT	it	it		s,IT	s,it		1	1		1			5	PA
14	m	s	h	s,it	s,IT	IT	it	s,it	s,it	s,IT	l		1	1		1			8	PA
15	f	s	h	s	s	s	s	s	s	s	s			1		1	1			
15	f	s	h	s	s	s	s	s	s	s	s			1						
15	f	s	h	h	it	IT	it	it	IT	l	l		1	1	1				3	
15	m	s	h	s,it	s,IT	IT	it	it	s,it	s,IT	l		1	1		1			7	PA
15		s	h	h	s	s	s	s	s				1	1	1		1	1		
16	f	s	h		s	s	s	it	IT	l	l		1	1						

Huay King Survey Results

Age	Sex	Occ																Count	Desc
16	m	s	h	h	s	s	s					1	1	1				2	Operator
16	m	s	h	h	it	s	s			s		1	1		1		1		
16	m	s	h	h	s	s		s		s		1	1						news of vi
17	f	s	h	h	s,IT	s		s		s,IT	s	1	1						Villagers
17	m	s	h	h	s,IT	IT				l	s,it	1	1	1				5	friend
18	f	s	h	h	s	s	s,it	s	s,it	s	s,it	1	1				1	7	operator
18	f	s	h	s,it	s,IT	IT	it	it	s,it	s,IT	s,it	1	1		1		1	5	school
18	f	s	h	s,it	s,IT	IT	it		s,it	s,IT	s,it	1	1					3	Teache
18	m	s	h	s	saw		s	s		s		1	1						saw it
18	m	s	u	s	s		it	s	s			1	1	1		1	1		Parents
18	m	s	h	s,it	s,IT	IT	it	it	s,it	s,IT	l	1	1		1		1	8	school
20	m	s	u	h	s	s	s	s		s									
20	m	s	h	h,s	s,IT					s		1	1	1				5	VH
20	m	s	u	h	s	s	s	s		s	h	1	1		1	1			
21	m	s	u	h	it	h	it	s	s	h	h	1	1		1	1			
21	m	s	u	h	s	IT	it	it	s	s	s		1				1		
21	m	s	h	h		s	s		s	h	h		1		1	1	1		
21	m	s	u	h	s	s	s	s	s	s	s								
22	f	HoWife	e	s,it	s,IT	IT	it	it	s,it	s,IT	l	1	1				1	4	school
22	m	s	u	h,s	s	s		s		s	s		1		1				
22	m		u	h											1				Brother
25	f	l	h	s,it	it	IT	it	it	w	s	l	1	1			1	1	3	school
25	f	l	h	s,it	it	IT	it		w	l	l	1	1			1		3	PA
25	f	HoWife		h												1			VH
25	f	f	e	i	it	IT	it	it	IT	l	l	1	1			1		5	PA
25	f	l	e	s,it	it	IT	it	it	w	l	l	1	1			1		5	PA
25	m	f	e	w,it	it	IT	it	it	IT	l	l	1	1			1		3	Saw it
25	m	f	e	l	it	IT	it	it	IT		l	1	1			1		3	PA
26	f	Can W.	e													1			teacher
26	m	monk	e	i	it	IT	it	it		l	l	1	1			1		5	School
28	f	Gov.W.	u	h,it	w,it	IT	it	it	w	l	w	1	1			1		4	PA
29	f	l	h	h	h				h	h			1						
32	f	l														1			VH
32	f		e	h												1			Kids
32	f	f	e	h												1			VH
35	f	Merchant	h	h					h			1	1		1	1			
36	f	l	e										1			1			VH
37	f	HoWife	h									1	1		1	1			PA
39	f	Merchant	h													1			
45	m	Gov.W.	u	h,s,it	s,IT	s,it	s,it	s,it	s,it	s,IT	s,it	1	1			1		10	PA
45	m	l	h	w	h,w	w	w	w	w	h	h		1						Don't knov
45		HoWife	e	h															VH
46	m		e	s	s			it				1	1			1			

Appendix D: Weighted Value Analysis

We used a weighted value analysis in order to quantify our otherwise qualitative analysis. Based on our definitions of accessibility and sustainability, we determined what measurable factors composed each definition. The factors we determined were as follows:

Accessibility factors:

- Location
- Availability of Computer
- Computer Literacy
- Affordability
- Internet Connection

Sustainability factors:

- Current Income
- Number of Users
- Potential Increase in Number of Users
- Quality of Service
- Exclusive Market

Our next step was to assign weights to each of the factors. We did this as a group as we explained in our methodology and analysis. The weights for each factor reflect their relative importance to accessibility or sustainability.

After reviewing the results of our study, we rated each center based on each of the factors. We then took a weighted average of the ratings to determine the relative accessability and sustainability of each center on a scale of 1 to 5. Table 11: Weighted Value Analysis Calculations shows all of our ratings and the calculations we made to arrive at each of our conclusions.

Accessibility factor	weight	Hang Hung	product	Na Kam	product	Hua Fai	product	Huay King	product
Location	2	4	8	4	8	4	8	5	10
Availability of Computer	3	1	3	5	15	3	9	2	6
Computer Literacy	5	2	10	3	15	2	10	3	15
Affordability	5	5	25	5	25	4	20	5	25
Internet Connection	4	4	16	3	12	1	4	3	12
Total	19		62		75		51		68
Accessibility Score			**3.26**		**3.95**		**2.68**		**3.58**
Sustainability factors	weight		product		product		product		product
Current Income	5	4	20	2	10	5	25	4	20
Number of Users	3	5	15	2	6	3	9	4	12
Potential Increase in Number of Users	2	2	4	5	10	2	4	2	4
Quality of Service	2	4	8	3	6	2	4	3	6
Exclusive Market	4	4	16	2	8	5	20	3	12
Total	16		63		40		62		54
Sustainability Score			**3.94**		**2.50**		**3.88**		**3.38**

Table 11: Weighted Value Analysis Calculations

Appendix E: Future Methodology

The methodology we have developed over the course of four weeks can be easily replicated in the future to study the centers in Mae Moh or other centers. We have included in the previous appendices the surveys, interviews, and analysis procedure that can be used in the future.

We found that certain interviews were much more useful than others. Groups studying the centers in the future should be sure to interview the center operator, village head, and village committee in each village. The interviews with the teachers at Mae Moh high school were also very useful for developing an overall assessment the computer literacy of the students in each village.

We also found a productive method for distributing surveys. Walking around the village asking people we see to complete our survey was difficult and time consuming because of a language barrier and the reluctance of many villagers. In addition, this method only allowed us to survey the people we saw, and only on the streets we visited. This did not really give us the opinions of a diverse group of villagers. Our surveys conducted in the centers only surveyed users of the centers. While this was useful for determining what the users used in the centers, it did not let us know why other people did not use the centers. Midway through our study, we began to poll students in the villages' primary schools. This was useful because it gave the point of view from all parts of the village, even though it was only from one age group's point of view. This allowed us to determine what types of technology were available in everyone's homes

We recommend a future group survey the same groups we did, but we recommend keeping the different surveys separate. Had we separated our surveys, we would have been able to collect significantly more statistical data from the survey. An additional option for surveys is to travel to Mae Moh High School and survey the students there. The only drawbacks are that not all students live in villages with IT Centers, and surveys would have to be sorted by village.

Our analysis method was sufficient to compare the villages to each other. There is room for improvement in our analysis, and our criteria may change over time. Future groups also need to take into consideration any changes that may be made in the centers.

Appendix F: Work Schedule

The whole IQP was conducted over the course of 8 weeks in Thailand. We spent a total of 4 weeks in Mae Moh in four different villages. We traveled to Lampang on January 18 and returned to Bangkok on February 15th

We assembled a rough week-long plan to conduct our study in each of the villages. We followed the same plan in each of the four villages. Upon arriving in each village and getting adjusted, we began by arranging times to interview each group we planned to interview. We spent several days traveling around the village conducting surveys as the same time we conducted our interviews. Towards the end of our stay in each village, we revised our survey to make it more understandable for the next village.

All of the work we have done is summarized in the following calendar.

January 2002						
Sunday	Monday	Tuesday	Wednesday	Tuesday	Friday	Saturday
		1	2 Arrive in Bangkok	3	4 Meeting With Dr. Nuntavarn	5
6	7	8	9	10	11	12
	Research northern Thai culture and revise methodology					
13	14	15	16	17 Meeting With Dr. Nuntavarn	18 Depart for Lampang Arrive at HangHung	19 Organize Schedule for four weeks.
	Continue research and methodology					
20 Interview IT Center Committee and Center Operator	21 Photocopy and translate IT Center Logs	22 Interview Village Head	23 Administer Surveys	24 Administer Surveys	25 Leave for the Village of Na Kam	26 Weekend trip to Chiang Mai with Khun Khao
27 Return Back to Na kam	28 Interview Na Kam IT Center Operator / Photocopy logs	29 Interview Mae Moh High School Teacher / Administer Surveys	30 Administer Surveys / Interview Na Kam IT Center committee (Focus Group)	31 Depart for Chiang Mai for Group Trip		

February 2002						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Chiang Mai	2 Chiang Mai
3 Return to Na Kam	4 Depart for Hua Fai / Visit Hua Fai IT Center.	5 Administer Surveys	6 Interview Hua Fai Village Head and Operator.	7 Administer Surveys / Na Kam IT Center Logs	8 Leave for Huay King / Interview Village Head.	9 Finish Translating Surveys / Build Survey Database.
10 Volley Ball Game / Family trip to Water falls.	11 Administer Surveys / Attempt to Interview Operator	12 Leave for Sukhothai Historical Park	13 Return to Huay King.	14 Conduct Interview for IT Center Caretaker.	15 Return to Bangkok	16 Relax and decompress
17 Relax and decompress	18 Meeting with Dr. Nuntavarn and Advisors	19 Revising Draft	20 Revising Draft	21 Meeting With Advisors / Revising Draft.	22 Revising Draft	23 Revising Draft / Dinner at Dr. Nuntavarn's House
24 Revising Draft	25 Meeting with advisors / Revising Draft.	26 Practice Presentation / Draft revisions	27 Meeting with Dr. Nuntavarn / Final Draft revision	28 Final Presentation and IQP Due.	1 Celebrate	2 Depart to Western Hemisphere