Chapter 4 – Project Lighthouse Sites

4.0 Introduction

The previous chapter highlights the emergence of important elements that provide the foundation for powerful learning environments. The discovery of the engine culture and the entrepreneurial spirit of the women's cooperatives as a rich basis for connections and learning emerged through the applied methodology. This demonstrates emergence at the level of a particular site. This chapter describes activities at other sites within Project Lighthouse in order to demonstrate how the sites varied and how the development emerged in different ways. This also demonstrates how the project as a whole emerged and developed where the resulting positive differences were a source of strength not often exhibited in top-down approaches.

4.1 Mae Fah Luang

Mae Fah Luang is a region of Chiang Rai province in the north of Thailand. It is tucked up against the border of Burma. Non-formal education is quite prevalent there. This is partially due to the weakness of formal education in the area due to the usual reasons of poorly trained teachers and very small populations of children. It also is due to the lack of regard the residents have for the value of the existing schooling. Another major complicating factor is that a large majority of the residents are from hill tribes, for whom, for the most part, Thai is a second or third language (after their hill language and sometimes Chinese). A final reason, I believe, is due to the strength of the NFE staff in this area.

When we initially planned Project Lighthouse, although we wanted to have one pilot focus on village learning centers, we did not plan to include Mae Fah Luang as one of these sites. Importantly, and to the great benefit of the project, an experience in our first workshop at the Chiang Rai NFE center changed this. I, along with Savalai Vaikakul and Brent Ridley, ran a short, five-day introductory Logo workshop in late August, 1997.

Although the original project plan specified six weeks of workshops and combined with six weeks of project construction, due to numerous reasons but primarily administrative problems on the foundation side, this did not happen. As noted elsewhere, the failure to give sufficient time for staff to gain familiarity with both the technologies and the approach to learning severely curtailed the possibilities within the project. While often the decision not to devote such an amount of time to staff development is made for budgetary concerns, this is a short-sighted decision, saving money at the outset but losing money, and more importantly, diminishing results in the long-term.

Another problem, which we confronted often in the first year of the project, was over-crowding of workshops. We tried to specify that no more than twenty participants should attend any workshop. Our idea was that if there were too many people, the intensity and effectiveness of the immersion experience would be diminished. We also would be less able to support the participants in their projects and less able to get to know them as people, learners, and participants. This would hurt our overall mission.

This idea of ours ran into several problems on the Thai side. First, there was a not an unexpected expectation on their side that our mission was to teach a particular piece of technology. Such a process is familiar to people. In such workshops, many more people than we requested can be accommodated. Despite the fact that we said many times that our purpose was not merely to teach a piece of software but to learn it as a concrete path towards thinking about learning in a different way, people constructed a very different meaning. For a Constructionist point of view, this is not surprising in the least.

This expectation combined with another particularly cultural phenomenon and left us with a workshop with more than sixty participants, triple the number requested.[1] The other factor in the expansion of slots was the difficulty in refusing participation to people. As word of our project spread, many people and schools asked to participate. The people in the foundation felt that it would hurt relations if we refused them. We argued that the workshop would be too diluted and ineffective for everyone and to ask the others to wait until we could ramp up. We were told that things did not work this way in Thailand and that would cause more problems than it would solve. We tried to hold the line but this was a design argument we lost. We did not argue strenuously as we depended upon the local foundation to help us to understand many things that were foreign to us. As we were just beginning our relationship, we did not want to begin with a scenario of our dictating to our Thai hosts. This was especially true in this case as this area that had many cultural implications of which we were not aware. It is another example of a design tension where

[1] In fact, despite our requests and pleas, this situation repeated itself several times. We began to joke that there was a 3x-multiplier effect just as in projecting dates for developing software.

there is no perfect answer but one is choosing among various options, each with positives and negatives.

This dispute underscored a recurring design tension between going deep versus going broad. We designed Project Lighthouse to go deeply in a few places so as to have the deepest and broadest long-term effect. We design the technological-fluency immersion workshops under the same principle. However, there is a drawback in equity. If we did not try to involve as many people as possible, then others would be relegated to the same, inadequate learning environment. These people would feel they were missing out and not as special as those chosen. This can be dangerous for both sides. However, beginning or expanding too rapidly inherently has the danger of so watering down any experience that no one can receive the expected benefit.

The original goal of working directly and deeply with the staff of the Chiang Rai NFE center was lost during this initial workshop. Many of the staff did sit in on the workshop, but, because their center hosted the event, they had to perform other duties to help the other, often influential and powerful, participants. Obviously this negatively impacted their opportunity to learn. However, hosting the event did establish Chiang Rai NFE as the first and primary Project Lighthouse site, placed these influential people on their side, helped secure on-going support and resources for them, and thus facilitated subsequent activities. So, despite that it did not follow our original plan and intentions, it probably did function in the best possible way establishing our project in this culture. The

inherently unforeseeable nature of the above immediate deviations from the plan points out the necessarily emergent nature of the project.

Perhaps the best, and totally unexpected results from following this emergent trail, were meeting staff from other NFE regions. They were invited as favors to other supporters. Dr. Suchin, who was chosen by Dr. Kasama Varavarn, at that time the Director General of Non-Formal Education, and Dr. Sombat, the head of planning for NFE and one of Dr. Kasama's top aides, to come to MIT to help plan and schedule the overall project with NFE. As he became more excited about the project, he wanted his home site, Lampang, to be included among the pilot sites. Through connections to Khun Ackachai, the head of the Chiang Rai center and Dr. Suchin, Ajarn Jirachai, the head of NFE for the Mae Fah Luang sub-district, was invited.

Ajarn Jirachai's excellence in so many dimensions brought him to our attention immediately. He quickly understood not merely the Logo programming, but also the ideas about learning and the concept behind the project itself. He participated wonderfully in all the discussions. It was clear he thought a lot about learning. What made it advantageous for us to work with him was that it was clear we agreed on many important issues. His projects were interesting, deep, and well thought out. He helped all of his colleagues. He was extremely pleasant and friendly and had a joyful and playful manner. Lastly, he stood up at the end when some people wanted donations of software and equipment to take a stance about what was and was not important in this project. It

took no time at all to decide to extend the project to Mae Fah Luang, where he was the administrator.

This decision added to the project in several ways. Primarily, it added because Ajarn Jirachai is such an excellent educator and he and his staff did wonderful work with children. Project Lighthouse added a way of thinking about learning and using technology that provided them with more tools with which to work. It also added in ways that other NFE sites could not.

We originally planned Project Lighthouse to work with children of all ages. We were directed towards working with NFE for several reasons. One primary reason was that Dr. Kasama was a big supporter. It also provided sites at which to work that were less structured and more open to experimentation than traditional formal primary schools. However, what we were not told and only discovered as we began to work, NFE cannot work with children until the age of fourteen, or after the end of compulsory schooling. However, because Mae Fah Luang was a small, rural site, with not so many children, the restrictions were much less. At Mae Fah Luang we were free to work with a wider range of children.

The residents of Mae Fah Luang are primarily from various hill tribes. Many speak an indigenous language and perhaps also Chinese. Thai is either a second or third language for them. Education of hill tribe children has been problematic for Thai educators for a number of reasons. Language difficulty is one huge reason. Others are the same as in

other rural areas in Thailand, i.e., little teacher training, high turnover of teachers, few resources, etc. Since this had been problematic in the traditional education, this was an excellent opportunity for Project Lighthouse to demonstrate new possibilities.

4.1.2 Activities at Mae Fah Luang

As in Nang Rong, we began with immersion environment to develop technological fluency. The children worked on long-term projects of their own choosing. As we did not have enough Lego materials due to their expense, the children's activities were limited to Microworlds Logo and building web applications. Even though Mae Fah Luang is very remote, and, we are told, only was electrified two years before our project began, through the generosity of the ThaiComm Foundation and Shinawatra Satellite, an experimental two-way satellite link was donated to Mae Fah Luang to provide connectivity. The use the people made of this link was quite powerful and it is this aspect of the work there upon which I will focus. Even though there were many other profound results, in many ways they mirror results in Nang Rong. Thus, I will focus on some unique aspects from this site. I will also follow the same protocol for the other sites described in this thesis.

4.1.3 Electronic Community Magazine

In July, 1998, Marina Umaschi Bers, Michael Best, and Josh Bers went to Mae Fah Luang to work in the Ban Thard village [Bers and Best, 1999].[2] We wanted to add more Constructionist technological tools to the project. This presented a good opportunity. The NFE center in Ban Thard actually draws learners from many surrounding villages. Some walk up to seven kilometers each way every time through quite hilly terrain they come to the center. We saw the magazine not only as a way to write and work with the web, but also to help build community across the disparate villages.

They used the Pluto software developed at the MIT Media Lab in the News in the Future (NiF) group [Driscoll, et.al., 1997]. Pluto enables a group to create, edit, and publish a multimedia, web-based newspaper. The software follows the format of a newspaper in the sense that one defines sections and places articles within them. More interestingly, anyone can author an article, but they submit them to an editorial board. Just as in real newspapers, the board discusses the articles and determines what they should publish and what to express. In this way the participants benefit not just from the writing, although that is a strong benefit particularly in this area where children rarely get the opportunity to write anything meaningful. They also benefit from the editorial discussion and decision-making.

[2] This work is described in more detail in their article, "xxx," to be presented at CSCL 99, to be held in December, 1999, in Palo Alto, California.

The children decided that one of the themes for their magazine would be wedding ceremonies. They would write about them, take pictures, show the costumes, add the music, print the recipes, and describe everything about the ceremonies.

When I visited Mae Fah Luang in March, 1999, the teachers related the following story to me about this project. When the computers were donated by the Suksapattana Foundation, through the donations of the Foundation's sponsors, there was not a facility to house them. Through the efforts of Khun Paron, the Siam Cement Group donated materials to construct a new facility to house the Lighthouse activities at the NFE Ban Thard, Mae Fah Luang site. Jirachai and the NFE staff decided to construct the building with lots of windows facing the village. They did not want the center to be separate from the community. They wanted the parents and other villagers to be able to witness the activities within the center with the goal of inviting their participation.

It deserves mentioning that although many people warned us of possible theft when working in poor areas, we have had absolutely none during the entire time of Project Lighthouse. We have had the same experience wherever we have worked. We believe major factors in this are creating an environment where people work on what is important to them, working on projects that have community impact, enabling a sense of ownership over the overall project, and the participants believing there is benefit from the project.

We only had ten computers for the project and more than seventy children participated. This too runs counter to the type of immersive environment we try to create, but since the

activity in Mae Fah Luang only emerged due to Ajarn Jirachai, it was the best we could muster at first. The children often worked in groups, but even still there were times that they could not work on the computer. In all of our projects a considerable amount of time is spent doing work not on computers. So, in Ban Thard you could see groups of children working together on the computers, or gathered together drawing plans on the basketball court in front of the NFE center, or gathering data throughout the village and hillsides.

The teachers told me that the parents visited often. However, when they saw the children talking, enjoying themselves, drawing outside, not sitting in classrooms, not listening to teachers' lectures, they began to complain to the teachers. "You are not teaching are children. They are not being serious. They are just having fun. Why are you wasting their time? This is not what school is like." The teachers tried to explain, but a few of the parents began to withdraw their children from the project.

Surprisingly, soon they brought them back. Now the teachers asked what was happening. The parents told them that previously the children had been ashamed of their nature culture. They did not want native clothing, or to learn the traditions, or to know their own history. Now, after talking to their parents and grandparents about all that is involved in weddings in order to put their community magazine together, this had changed. They asked their parents to make native clothing for them. They wanted to learn to cook traditional foods. They asked about the music, the crafts, the history, and so on. The parents said, "We do not know what you did, but whatever it was it worked so keep on doing it."

Before beginning Project Lighthouse, his majesty King Bhumipol of Thailand raised concerns about children not learning to socialize with each other because they were working individually only on a computer. We were quickly able to dispel this concern. He also expressed concern about bringing in new technologies and thereby hastening the demise of local culture and being subsumed in western culture and values. The experience in Mae Fah Luang demonstrates how this need not be the case. Through television, music, marketing, and other media, this erosion of local culture and inundation with mass marketing commercial culture was underway. Their use of the web as a place for construction of their own artifacts and narratives, and not just a place for consumption of others' artifacts and narratives, helped build a new appreciation for their own culture that previously had been dormant.

4.1.4 Electronic Commerce

Another new effort at Mae Fah Luang is to institute electronic commerce (e-commerce). In discussions with Ajarn Jirachai at the beginning of Project Lighthouse we worked on how to make the project sustainable. We knew that even though the initial expenses were donated by the Suksapattana Foundation, the sponsors, and the national education ministry, it was likely that this could not continue over a long period of time. This also could not cover the expansion of the program, assuming that it was to be successful. Finally, there would be added costs in terms of electricity, maintenance, and training.

One way of offsetting at least part of these new costs would be if we could use the technical infrastructure of computers and telecommunication to base a new electronic economy. Economic progress in the past was severely limited in Mae Fah Luang due to terrain, climate, and difficulties in transport. This is typical of many areas worldwide [Sachs, 1999]. Our hope was that as the people gained technological fluency, they could support their own e-commerce. They could use it to increase their agricultural efficiency, their buying and selling power through cooperatives, to be able to sell products to areas beyond their immediate geographical area, and eventually to provide knowledge-based services to other areas. They hoped to change the nature of the economy without having to open the area to more and more tourists, with all the incumbent problems.

This effort is just now beginning. People in Mae Fah Luang are creating their web stores and creating new products. Through the help of Michael Best at the Media Lab and Arnan (Roger) Sipikitat, of Chiang Mai and now a graduate student at the Media Lab, the Mae Fah Luang e-commerce site will debut at the Media Lab's e-markets SIG in October, 1999.

4.1.5 Integrated Learning Environment of the Ban Pa Sang Nang Ngen in the Mae Fah Luang District

As in the other sites, political issues having nothing to do with the project directly, or the ideas about learning environments, had a significant impact on the progress of the project. For a period of time, due to political reasons and jealousy over the recognition received through his involvement and success in Project Lighthouse, Ajarn Jirachai had

difficulty with his supervisor. Some of his teachers at Ban Thard were transferred, and then Ajarn Jirachai himself was temporarily re-assigned to a much more remote village, Pa Sang Nang Ngen. Only through the efforts of Khun Paron did this situation get resolved satisfactorily. And, true to the commitment and vigor of Ajarn Jirachai, he produced extremely interesting work in the new site as well. In this site the formal and non-formal primary education efforts were merged and working in the Constructionist way of Project Lighthouse.

I first visited Pa Sang Nang Ngen in March, 1999, accompanied by others from Project Lighthouse. This was the first visit to the site by any non-Thai. This site developed purely by Thai efforts. When I walked into the NFE center, there were many children busily at work on their Microworlds Logo projects. Many of them were celebrations of their hill tribe culture. Music they had recorded was playing from several machines. They had imported photos of their fellow villagers in their costumes, imported local music, and had produced little animated stories and histories of their tribe and its culture. The music was lovely and the pictures beautiful. The enthusiasm of the children was contagious.

Figure 1 -- Hill tribe woman and children at Pa Sang Nang Ngen Non-Formal Education village technology center

Figure 2 -- Same group after children had uploaded digital photograph of the woman into their Microworlds Logo project

Some of the children grabbed me to proudly show off their new garden plots. They had planted tiers of new vegetables. Some of these vegetables were not typically grown by this tribe. The NFE and local agricultural agencies had introduced the ideas to them, knowing that these plants would grow well in these conditions. They believed it would help supplement their income and provide needed nutrition to their diets. They hoped that the new agricultural methods would also help change them from practicing slash and burn farming, common to that area, which causes so much ecological devastation.

Figure 3 -- Pa Sang Nang Ngen vegetable terrace

We retreated to a shady area to discuss what to do at this site. I asked many questions about what they were doing, what they thought, what they liked, what they believed needed to be improved, and so on. Naturally, they wanted to continue the Logo work they had begun. We also converged on the idea of using the agricultural projects as an integrating force for all the work. Just as in Nang Rong, we worked in a Freirean way, using what was important to people as the overall basis for study and practice. We discussed doing little experiments, both on and off the computer, about the new agricultural methods. They could look at top-soil erosion, scientifically measure the productivity of the various methods, work with both the soil and with Logo-based simulations, study nutrition and various diets, and so on.

4.1.6 The Mae Fah Luang Example

Mae Fah Luang provides a compelling example of what is possible in learning environments, even in areas where traditional efforts have failed, and even in the face of political adversity. As in Nang Rong, the expense of bringing personal computers to poor, rural areas was more than offset by the benefits, even in the short term. This does not even consider what should become possible over time. Rural teachers have performed extremely well. Children have learned an incredible amount. More importantly, learning has become a fun exercise, not drudgery.

Not only have the children learned considerable mathematics, science, programming, logic, and even social studies, but also they have learned something critically important about citizenship and participation. Rather than leaving the area, or remaining unengaged,

or just letting whatever happen, people have become active agents in studying and improving their environment. Children in Mae Fah Luang have taken control of a new fruit-tree orchard to provide food and income to their families. On my visit, which was at the end of the dry season, despite the protests of the elders who wanted them to show off their projects and progress to me, they left because there was a fire on the hills and they wanted to ensure that it was contained and, even though they had no personal property in that area, that their region would be harmed as little as possible. These changes in attitudes about learning, themselves, and their relationship to their culture and their community, is perhaps the best result from Project Lighthouse.

4.2 Chiang Rai

4.2.1 Introductory Activities

Chiang Rai was the first place we began working with Thai teachers, running a brief introductory workshop in August, 1997. Although the stated purpose was to begin working with teachers, we had triple the requested number of attendees. Thus, the intended audience of NFE teachers did not have a real opportunity to work and learn. Moreover, they did not have a chance to truly follow up after the workshop by developing their own projects or thinking about how to work within Project Lighthouse.

In November, 1997, Seymour Papert and a number of his students (Savalai, Marina Umaschi Bers, and myself) ran another technological fluency immersion workshop for Chiang Rai teachers, plus a few from Lampang, Mae Fah Luang, and Bangkok. We introduced working with Microworlds Logo and Lego/Logo. We also spent a

considerable amount of time in discussions about learning. Both sides are critically important. Merely discussing issues of educational philosophy without an accompanying activity too often devolves into nothing upon which people can act. This tendency is exacerbated when one is attempting a more radical reform. There is nothing concrete and few experiences upon which to base discussion. On the other hand, merely working with technology without an accompanying discussion may help embed the technology, but will also be unable to fundamentally change practice. Our goal is to help provide transformative experiences for the teachers upon which to base a concrete foundation for discussion about changes in learning environments.

Originally, people wanted just their technology instructors to enter our project. The reasoning was that since this project used a lot of technology, they were the proper attendees. While learning about and becoming proficient with technology is a goal, we want the project to extend into domains other than technology. An analogy is the purpose of textual literacy. We need to spend time learning to read and write, however reading and writing provides benefits in understanding math, science, and other fields.

The workshop was quite successful in that people did learn to program with Logo. But, more importantly, people did start to think more deeply about teaching and learning. Due to shyness and language difficulties, at first it was difficult to have large group discussions. So, we broke into smaller groups of five teachers with one or two of us. This way we could have deeper discussions and everyone could participate.

The teachers told us that even though they had all been to teachers' colleges, they never had discussed learning, only teaching. That is, they were trained in how to explain material, but not given the opportunity to think about how people learn. We spent a lot of discussion time reflecting upon and conversing about learning experiences both in and out of school. It was unanimously felt *that their most powerful learning experiences as well as learning the things they cared about the most happened outside of school and without formal instruction*. This was quite a revelation for them, as was the feeling of disjunction between learning and school teaching. At the end of the workshop, people chose whether they wanted to participate in Project Lighthouse and attempt to create new learning environments.

Although the teachers did not have an opportunity to work on any projects of their own, we ran another three weeks of workshops in January 1998. As January is the Independent Activities Period (IAP) at MIT, none of the students had class responsibilities during this time. Thus, a large group came and was able to work in each of the five original pilot sites. We had the benefit of several Thai undergraduate students joining us, which helped immensely. We decided it would be best if each group would focus on one site in order to build relationships and help develop deeper projects and activities. Most of the group began in Chiang Rai and then went elsewhere. Deb Roy, Michael Best, Carol Sperry, Athicha Muthitacharoen, and Piyada Phanaphat worked in Mae Fah Luang. Arjan Schutte and Warit Wikachool worked in Lampang. Cynthia Solomon and a group of fifth-grade students from Milton Academy, along with Sperry, Best, Roy, Vaikakul, Alice and David Cavallo all worked in Chiang Rai. Solomon, Sperry, and both Cavallo's worked at

Vachiravudh College. Vaikakul and both Cavallo's worked in Nang Rong. The Thai undergraduate students, Wikachool, Athicha, and Piyada, worked at each site.

It was interesting, though not surprising even though highly unusual for most educational institutions, that the unique character, talents, and interests of each of the visitors from MIT had different affects on the people and the sites. The visitors developed relationships with the teachers, administrators and learners from the various sites. Different sites picked up upon the ideas, words, and activities of the people who visited their site. They then took their own approach based upon their experience and relationship with the people who visited. Each site developed in different ways due to this, but rather than being viewed as something that deviated from a desired, pre-planned program, this is viewed as a strength. The relationships formed between the visitors and the hosts helped the hosts construct their own views on what was important, what to do, and how to do the activities. They then deepened their relationships with their students. Thus, the work was appropriated throughout the project through all levels.

4.2.2 Initial Situation

However, once the workshops ended they faced several problems. Due to the funding model within NFE, the center could not afford to give the teachers time to work on their own projects and develop their own fluency. They also needed the teachers to teach, as NFE centers are funded based upon the numbers of students enrolled. Not surprisingly, this encourages over-enrollment, and does not reward accomplishment. Since the technological "courses" attract more people than traditional ones, the funding realities

pressed teachers into service before they had an adequate opportunity to learn and develop under the new Project Lighthouse model. Given that the NFE teachers are poorly paid as is, with most working on temporary contracts without benefits or job security, and that certain classes of teachers are paid based upon the number of students in their classes, the pressures to begin immediately were too great to overcome.

When one examines the mission of a learning institution such as NFE, the fact that learning results and teacher development receive short shrift while funding models rule the operations seems ludicrous and obviously in need of reform. Yet, this rarely surfaces, not by anyone's bad intent but just through bureaucratic inertia and stagnation. How one can expect teachers to work with learners in areas the teachers have not had opportunity to learn is bizarre. Before Project Lighthouse, many in the educational and political establishment questioned the ability of these teachers to learn the technology, let alone to guide learners in working with it. Yet, when the teachers had adequate time to develop their own fluency, as demonstrated in each site, they excelled. They could be more effective than people coming from outside with backgrounds in technology and learning simply because they knew the people, the culture, the situations, and were better role models than the outsiders. That time and again neither respect nor time is given to these teachers is self-defeating and short-sighted.

The lack of development time led to a second detrimental factor. Even when the teachers believed in a more Constructionist approach to learning, they did not have adequate examples upon which to base their practice. They were familiar with instructionist

classrooms and knew how to operate in them. But how one could work in a learner-centered, long-term project-based environment was too foreign and too difficult to imagine and create fully on their own.

We inadvertently fed into this problem by the way we ran our workshops. This was design problem of which we were aware, but unable to decide how to do otherwise. Because we, except for Savalai, did not speak Thai, we spent more time at the front of the classroom during workshops than we would have if we shared a language with the participants. We told them numerous times that this was the case and described how we operate on a more individual basis. We told them how we would discuss more with each person to try to develop relationships with them; to get to know their interests and to base projects upon those; to observe their work and question them to try to determine what they were thinking as they programmed; and to use these factors as a basis for explanation and suggestion to help them make their work and thinking more robust.

Not surprisingly (we certainly should have known better given our approach and philosophy) the fact that we told them this many times was outweighed by what we did. People followed what we did, and not what we said. People came to talk about an "MIT way" of running workshops and insisted that everyone follow this. Again not surprisingly, most teachers could see through this contradiction, but felt helpless to disobey the instructions from above. This too slowed the progress of the project, although it still is hard to think of alternatives when one does not share the language.

4.2.3 New Life Hostel

One of the original goals for pilot activities in Project Lighthouse was looking for ways to provide better learning environments for at-risk youth. One of the efforts in Chiang Rai was the first to attack this situation.

Youth prostitution is a major problem in Thailand. This so tragically affects so many young women and men. The impact on their lives is devastating. The degradation is horrible, but health and drug problems compound the problems dramatically. Drug use debilitates so many of these youth. Sexually transmitted diseases are rampant. AIDS plagues upon this population. Even the specter of AIDS itself causes problems as this causes sexual predators to try to find younger and younger prostitutes to protect themselves from disease. When the prostitutes are too old or sick or damaged to continue, they are discarded with no basis for future earnings and no social structures for support.

The New Life Hostel in Chiang Rai is one attempt to deal with the prostitution problem. It is run by missionaries and they try to provide a safe environment and training to help prevent girls from entering prostitution or to help them recover. The young women live at the hostel, although some go to their home villages on weekends. The hostel provides rudimentary vocational training to them. The Chiang Rai NFE center provides their basic education. As almost all of the girls come from rural villages, they have had little formal schooling. Many are from hill tribes – for them Thai is a second language, which adds difficulty to providing learning opportunities for them.

In the August workshop, Savalai Vaikakul worked with a small group of them quite a bit. Savalai introduced Logo and programming. Since the girls' native language was transcribed into written form by other missionaries, they used the same alphabet as in English. This facilitated communication and programming for them as we did not yet have the Thai version of Microworlds Logo to use. They found that creating little animations was quite fun and this encouraged them to continue working within Project Lighthouse.

The Chiang Rai teachers, particularly one known to us as Mike, worked with the New Life group. They developed software projects, built multimedia presentations on topics of interest to them, and did turtle geometry, in addition to their regular studies.

In March, 1998, MIT Media Laboratory Professor Gloriana Davenport, assisted by two of her graduate students, Philip Tiongson and Arjan Schutte, led a one-week workshop for the New Life group. Professor Davenport is the head of the interactive cinema group at the Media Lab. The goal of the workshop was to introduce using images to tell stories. The idea was that this would be the first of a number of efforts in this vein, where each of these would build upon the previous one.

The initial workshop would use still images from digital cameras. The learners would do a photojournalism project on a mutually agreed upon theme telling a story using images and text. They would place their work onto the web upon completion. The learning goals were to further develop technological fluency, develop narratives, learn to use image and

text, think about light, texture, mood and other elements to strengthen visual storytelling, as well as to learn about the issues surrounding the topic of their stories. We planned for follow-up activities using video as well as still images to further deepen ideas about narrative. Other projects would with other media would also touch upon the issues of light, shadow, texture, and so on. The connections from a variety of projects in a variety of areas with a variety of media clearly provide a rich source for learning with depth.

The group decided their theme would be about the lives of people living in a nearby AIDS village [Davenport, 1998].[3] This is a village composed of people who have AIDS and were evicted from their villages, and moved to a new site outside the village limits. The young women worked in teams of three or four to put their articles together. They visited the village and interviewed a number of the residents. Several of the young women wrote about the impact of the visit. One of the groups took on the point of view of one of the villagers, who described his experiences and feelings. Professor Davenport felt it quite significant that they did not merely present their own views, but adopted the point of view of another to make their story more compelling.

This type of work follows the Constructionist approach of the project. Rather than teach photojournalism, or narrative using only text, or issues about health, by lecturing, by lessons, or by a pre-planned curriculum, Professor Davenport and her students let the young women guide them to the topic they felt most interesting. They went out and actually built something, in this case a web site telling a story with text and image. They

[3] This work is described in more detail in the article.

used technology, but did not spend weeks or months beforehand being taught the prerequisites.

4.2.4 Emergent Developments

As we did with every visit, we wanted our people to work directly with the learners, with the local teachers and staff from other Project Lighthouse sites. This was one attempt to rectify the workshop problem mentioned above. This provided concrete examples of how to work with students in a non-instructionist way. This also was an example of how we wanted to work everywhere. That is, with children doing real work in the company of people who know how to do the work and are passionate about the work and the children.

This work tapped into the joy that Dr. Suchin, based at the Lampang NFE felt about photography. As Dr. Suchin had become an integral participant in Project Lighthouse, he participated in the initial constructionist immersion workshops in Chiang Rai, the Pluto workshop in Mae Fah Luang, and now Professor Davenport's workshop in Chiang Rai. His enthusiasm for photography led him to help initiate such photojournalism and electronic community magazine efforts in Lampang. No staff participant at the Chiang Rai site felt similarly about photography and thus such efforts did not rake root there.

This, however, was not bad as the staff in Chiang Rai worked according to their interests and talents. For example, Nong, who came from Chiang Rai to assist us in the village projects in Nang Rong, worked in villages in the Chiang Rai region. As she had a background in healthcare, she focused a number of projects along this line. Neung and

Bom enjoy electronics and technology and had great success with children who liked working with machines. All of the teachers worked well with Logo, and when I visited the Chiang Rai NFE center in March, 1999, I watched the end of term exhibition by groups of students. Each one had chosen a theme and developed programs and a multimedia presentation on their theme. They had gone into depth on a variety of subjects, examining how something was practiced in the area, and proposing improvements. For example, one group looked at traditional medicine, another focused on vegetable farming, and a third on issues of poverty. The presentations were quite entertaining. Their engagement far beyond how these groups had previously done in school. What makes the results more positive is when they are taken in the context of the typical Thai public school experience. These children do not get the opportunity to choose topics of study, or to make presentations, or to critically examine their environment and propose alternatives. This type of work is a concrete example of achieving the goals in the original proposed education reform, with the target population.

What is particularly impressive in Chiang Rai is their commitment to improving the learning environment. This begins with Khun Ackachai and continues throughout his entire staff. They tried various activities and formulation. They review the results. They make adjustments in a continuing effort to improve their work. They also pull from as many resources as possible to reach more people and provide as good a learning environment as possible for as many as possible, particularly for those who have not had good learning experiences previously.

4.3 Lampang

4.3.1 Background

Lampang is an industrial city a few hours from Chiang Mai towards Bangkok. Due to the involvement, interest, and support by Dr. Suchin and his NFE staff, we decided early on to expand efforts to this site. Unlike the Chiang Rai site, which is in the center of the city, the Lampang site is a large and somewhat isolated campus. The Lampang site serves the entire northern region, while the Chiang Rai site at which we work serves the sub-district and another site serves the Chiang Rai region. Thus, the Chiang Rai site facilitates involvement with its surroundings, both by learners going out and by visitors coming in. The Lampang site, on the other hand, is more self-contained as a learning environment. This difference plays out in the projects of the two centers. This is neither good nor bad in and of itself. This just highlights the different design tensions intrinsic to the project leaders, project staff and learners in terms of what they want to do and what the environment affords.

4.3.2 Initial Activities

We began our initial activities in Lampang the same as everywhere else, by holding technological fluency immersion workshops. As Dr. Suchin and several teachers had attended a couple of these workshops in Chiang Rai, they were better prepared to begin work than in other sites. Dr. Suchin and the other administrators, particularly Ajarn Narawan, who held the same position as Ajarn Jirachai in Mae Fah Luang and Ajarn Ackachai in Chiang Rai, decided to allow the teachers to co-facilitate the efforts. This

helped them immensely as the burden to know the technology and help each student develop was not too great.

They outfitted a large room with the computers, and as this site and the Chiang Rai site had able technical support, they networked the machines, hooked up display projectors to the computers, and had a sound system.[4] This facilitated working in and presenting to large groups. These sites were internet-ready, but the local phone systems and national internet infrastructure were so weak that we were unable to use the internet and world wide web in the ways that we had designed. Through the tireless efforts of Khun Paron and the generosity of the ThaiComm Foundation and Shinawatra Satellite, we received two-way satellite hook-ups first for Mae Fah Luang, and, soon, for the other Lighthouse sites.

In January, 1998, two MIT students, Arjan Schutte and Warit Wikachool, whom we all knew by his nickname of Peng, an undergraduate of Thai nationality, led a few weeks of technologically-based Constructionist project work. Although both were involved in the project because of their interest in learning and technology, and Arjan had done some work for educational technology companies, both had backgrounds in technology, not learning. Thus, they focused their efforts in Lampang on using images, developing web sites, and making multimedia histories using Microworlds Logo.

[4] We were indebted to staff at Lampang, and Neung and Bom in Chiang Rai, plus the Dr. Chaiawat and his staff, particularly Arnan (Roger) Sipikitat (who is now a graduate student at the MIT Media Lab) of the Computer department in Chiang Mai University for their able, dedicated, and cheerful work and support.

One of the first things they did was to re-arrange the layout of the room. At first, the layout was in rows of desks, typical to most classrooms. However, this type of layout focuses attention away from colleagues and towards the teacher, inhibits interaction, loses common free space, and structures the interaction towards a teacher lecturing. Since our approach is to place the emphasis not on the teacher but on the learners, their activity, and their interaction with each other, they moved the desks and equipment so that everyone was in a circle. This not only facilitates collaboration and interaction among peers, it implicitly but essentially re-directs the power relations of the site.

Due to the playful and friendly nature of both Arjan and Peng, the few weeks they spent in Lampang were enjoyable and helped establish another implicit but deeply felt component of Project Lighthouse. We wanted to establish that it is not a contradiction that learning environments can be fun while the work is difficult. Too often children view school as painful. They are old they need to put up with it, as it will help them later. Some accept this and some do not. However, this need not be the case. Often, the work undertaken in Project Lighthouse was more rigorous and more difficult than any of the learners had previously attempted in School situations. Yet, they not only willingly participated and worked without coercion, many excelled. This had a greater impact on their sense of themselves as intelligent and capable people more than any verbal encouragement (although of course we supplied that when necessary as well).

Peng was just one of a number of Thai MIT students who assisted in Project Lighthouse. They provided tremendous assistance to the project in many ways, and, we believe, the

project assisted them considerably as well. When we first began planning for the project, we held public informational meetings at MIT. Among those invited were the Thai students. A good number volunteered to participate. We held workshops at MIT to familiarize them with the approach to learning environments and to the technology. They did the initial work of translating Microworlds Logo into Thai and helped debug the localized version. They helped plan the project and provided good information that would have been slow to obtain otherwise. Four of them, Savalai, Athicha, Peng, and Piyada, went to Thailand to assist in the workshops and provide immensely helpful translation. Savalai went on to become a student of Papert's. The others all worked in the undergraduate research opportunity program (UROP) at the Media Lab. Their efforts were so beneficial to the project and to the students that getting the assistance of national students has become a staple of every project taking place in other countries.

4.3.3 Constructionist History Project

One significant project begun during the January work was by a fifteen-year-old young man studying to be a Buddhist monk. He took digital photographs of many artifacts found in the local temples. He then created a Logo-based multimedia history of Buddhism and Thailand by tracing the paths of the artifacts from temple to temple and city to city. He wrote the reasons behind the movements, putting it into the context of Thai history. It was a beautiful and deep project, and an example of a Constructionist approach to history and writing. Unfortunately, the project was lost when there was a system failure, and, although this was specified when the networking was installed, no

one was yet backing up the systems. This painful lesson helped insure subsequent diligence in backing up.

4.3.4 Lego/Logo Workshop

In March, 1998, as part of the introductory efforts, Fred Martin, a research scientist at the Media Lab, along with Wanda Gleason, an educator who formerly worked in Papert's group, and Claudia Urrea, a graduate student of Papert's, led a one-week Lego-Logo workshop. The previous week they led a similar workshop at KMUTT, a technical university in Bangkok. As usual, they worked directly with groups of students and teachers, who all built Lego projects. Other Lighthouse facilitators from other sites also participated. While the students and Project Lighthouse staff both worked on their Lego contraptions, the Project Lighthouse staff also participated in discussions about learning, about using Lego, and so on.

As we often do, the group presented a particular Lego design challenge. Everyone would build something of his or her own design to accomplish a particular task. The task varies from event to event. It can be something like finding and gathering all the ping pong balls into one place, or pushing a number of soda cans out of a marked circle, or navigating a maze. In this instance the challenge was to circumnavigate a tree in the courtyard. This task was made more difficult because of the cobblestone covering the ground. Thus, the vehicle needed to not only determine a proper path, but also needed to be strong, sturdy, and flexible enough to traverse the ridges and stones without getting stuck or stalled.

During the workshop Fred noticed the mechanical savvy of a group of the students. It turned out they were studying to be motorcycle mechanics. They showed tremendous creativity, resourcefulness, ingenuity, and analytical prowess. They were able to devise unique designs to accomplish tasks quite difficult with Lego. Some of them resembled motorcycles in that they only used two wheels. What was ingenious was that these two wheel vehicles could still turn and remain stable. Fred remarked that their technical expertise and building was the best he had ever seen anywhere over the more than ten years doing Lego workshops around the U.S. and the world. This includes working with engineering students at MIT, professors and researchers, science teachers, and professional engineers. This is high praise indeed, yet this group of children were not deemed academically proficient in their prior School careers.

One could try to explain this away by saying something like, "Well, what would you expect? They are studying to be motorcycle mechanics. Of course they have this ability." What such an attitude denies, however, is both that the intelligence required to accomplish what they did, and that this intelligence combined with their experience and interest can be mobilized as a basis for understanding other knowledge domains. This is the example from the Project Lighthouse work in Nang Rong, whereby, if one creates such a learning environment and sustains it over time, this potentially provides tremendous promise for many youth previously deemed incapable of doing serious academic work, or good with their hands but not with their heads.

These activities with Logo and Lego/Logo highlight a place where the technology affords something fundamentally different from previous technologies, particularly paper and pencil methodologies. The youth here, as did the youth in Nang Rong, Chiang Rai, Mae Fah Luang as well as other sites in which we have worked, were able to take their knowledge of and interest in engines and actively transfer it and apply it towards other areas.

While it was not a point in a one-week workshop, when we work in an environment over a long period of time, we use their construction experiences as a basis for discussion and reflection about what they are doing and why it works. This enables a concrete context for the discussion, and enables the situating of powerful ideas within the domain. For example, abstract concepts such as torque, force, surface tension, can be difficult for many to grasp in traditional classroom instruction. However, naming the concept in the context of a learners' own artifacts that they constructed themselves, that they in all likelihood struggled somewhat in order to get it to function in a desired manner, helps provide concrete and felt entry ways into the domain. As they meet more and more of these concepts through their own constructions and expressions, they develop a fluency around working with the concepts, materials, problems, and principles. This fluency is theirs, based upon their work, their interests, their ideas, and their struggles. It bumps up against the realities of getting something to really accomplish a chosen task in the way the learner designed and constructed. This happens in a culture of construction, around people who care about and know about, and, hopefully, are passionate about the domains of work.

When I introduce working with Lego to a group in a typical context of beginning a long-term learning environment and not merely for a one-week session, I do not begin with motors. Normally, I begin with running non-powered vehicles down an inclined ramp, with a goal of seeing which can go the farthest. Many children quickly transpose this into going the fastest, which raises interesting points. Before we begin, I challenge them to think about what type of design they will use to accomplish this. What will be better? Should they make a light or a heavy vehicle? (Children almost unanimously think having lots of weight is important as it will help them go faster down the incline). Should they have many wheels or a few? Should they use big wheels or small ones? Should they make a long vehicle or a short one? Should they make a wide vehicle or a narrow one? Interestingly, and importantly for developing a real-world view of scientific practice, there are many variations that enter this based upon environmental characteristics. For example, if one uses a thick board for a ramp, there will be a drop from the end of the board to the flat surface. This introduces a new complexity into the situation as the vehicle must be steady and sturdy enough not to be disrupted by the drop. If the ground is not exactly smooth, or has little pebbles, this adds another wrinkle.

The project helps get people to see how to put vehicles together to minimize friction (one of those concepts to be named). More importantly, it gets people to take a stance, to make a hypothesis. Then, as they begin building and testing, they not only measure their work, but we challenge them to think through robustly what is making a difference. They meet

the mechanical principles they will continue to see in an enjoyable way. They begin to think through how to work on their own experiments successfully.

After this, I often challenge them to build something that will climb back up the ramp. This will require motors and gearing. I challenge them to climb the most radical angle. Again, I pose the questions of what will make a more successful design. There is not just one answer. As they try out their various designs, we strive to be rigorous about what will work and why.

After this, we often pose various challenges as the group did in Lampang. One example I like to do, that connects with other activities, is to go out and examine the local environment and then build models of how they would like to envision their city or village of the future. This engages them with both a critical examination of their environment and an exercise at designing a future. This engages them with issues of how they would like their environment in the role of capable and positive actors within that environment. This is also where the project goes beyond science and math to study other areas of knowledge.

4.3.5 Northern Region Constructionist Learning Lab

In June 1999 the Lampang NFE center began a development program for teachers from the northern region of NFE, formal primary education, and a few from the teachers' college. This was the first internal attempt to broaden the scope of the project. The participants would take three one-week workshops on Logo, Lego/Logo, and

"photojournalism." While the names and structure sound very curriculum-like, the approach and activities were the same as in the other Project Lighthouse sites.

Ten of the teachers from the Lampang NFE, who for the most part have been active in Project Lighthouse since its inception almost two years ago, would each serve as a mentor and resource coordinator for five of the participants. When the participants return to their sites, they would begin to change the culture of their local learning environment. The Lampang mentor visits regularly, helps out, observes the situation, and offers advice and support to the teacher. The goal is not to replicate anything, but rather to facilitate the teacher's appropriation of the ideas.

4.3.6 Future Steps

The next steps, beginning now in November 1999, are to create local learning environment clusters. The idea is to build critical mass of participants, activities, and ideas, so that the people and sites can build upon each other. Rather than only working in NFE centers, the Lampang area will begin work in primary schools, Non-Formal centers, and community centers. The local teachers' college (called Rachabhat in Thai) will create a new line of Constructionist learning. The professors at the college will create new courses on constructionist learning and technology. The students and teachers will do their practicuum work in the local pilot sites.

4.4 Vachiravudh College

4.4.1 Background

Vachiravudh College (VC) is an elite private school for boys. The school used to only be open to members of the royal families, but was opened to the public some years ago. The school originally was fashioned after a British public school model. Some of the board of directors of the school felt the school was no longer functioning to the level they would like. They hired Dr. Chaianan Samudavanija to return the school to its high standing.

Dr. Chaianan has written extensively on education. His philosophy of learning is very similar to that of Seymour Papert, although Dr. Chaianan did not focus on technology. In November 1997 Khun Paron hosted a meeting between the Papert and the Lighthouse team, and Dr. Chaianan, the headmaster, and a few others from VC. Once the two teams met each other, discussed their views, it was evident to all that their was agreement on goals and methods as well as the beginning of a very solid friendship. The groups agreed to collaborate with each other, and to introduce the technology and the ideas of constructionism at Vachiravudh. Vachiravudh, in turn, would open its computer facilities without charge to host workshops for Project Lighthouse and for work with the public schools of the Bangkok Municipal Authority (BMA).

Some objected to the idea of including Vachiravudh in Project Lighthouse. They argued that Project Lighthouse was to assist those who had not been well-served by the existing educational establishment. Vachiravudh certainly did not fit that. Others argued that the goals of Project Lighthouse were to break mindsets and provide new models of

technologically rich learning environments. Certainly Vachiravudh could contribute to that. In addition, there is a nice statement when the activities and approach used in an elite private school is exactly the same as in a rural, non-formal center for hill tribe children.

4.4.2 Initial Activities

The team from MIT ran workshops at Vachiravudh in January 1998 for VC teachers and teachers and administrators from the BMA. Many teachers from Vachiravudh attended. The goal was for them to use the ideas, and begin to adopt the technology into their classrooms. This was to fit with the broader change effort already begun by Dr. Chaianan.

The results in the first year were spotty. Some teachers adopted more. Some did not change at all. This was the case overall, not just with Lighthouse activities. Dr. Chaianan was disappointed with the pace and quality of the change. This example reinforces the difficulty of educational reforms. In this case, the leadership of the school was firmly and actively engaged in the reform. The scale was relatively small, comprising just one school. There was a coherent philosophy for and support of change. Yet, the results were minimal. The entrenchment of the grammar of school is difficult to dislodge.

For the second year, he decided to do something differently. He took the two third-grade teachers (VC begins with grade three) and the computer teacher, and changed the overall

environment for them to be fully constructionist. They would construct both with and without technology.

Although it is still early, everyone is excited about the changes. The consensus among the administrators, teachers, and observers from the Suksapattana Foundation believe the year was quite successful. The projects of the students exhibit more depth than the traditional rote schoolwork. More importantly, the students and even the teachers are engaged in and excited about the work. The plan for the next year is to have the fourth grade teachers continue with this approach with the current third-grade students, while the third grade teachers initiate a new group of students. As the new approach becomes more entrenched, encompasses more people, and comprises more of a substantial culture with accompanying artifacts and lore, they can attempt bolder and broader changes in the overall school.

A critical component to enacting more sweeping changes is to gain parental and community support. As people are familiar with the existing educational system, and know what is required for success, if they believe they have the means to have a high probability of success within the system, they are less likely to support widespread changes in educational practice**,** even if they believe that the changes are for the best educationally.

Without a doubt the parents of Vachiravudh students believed their children were poised for success and were likely candidates to be admitted to the extremely scarce slots in the

most prestigious universities. This situation made it much more difficult for Dr. Chaianan and his staff to enact change. Fortunately, the board which hired him had significant clout and provided sufficient backing for him to take the chance to try to dramatically change the learning environment at VC. The board represented the upper echelon of Thai society and believed that a change towards a more constructionist learning environment was necessary.

Dr. Chaianan was frustrated not only with the pace of change at Vachiravudh, but also within Thai educational institutions in general. He hoped that he could convince the universities to broaden the criteria by which they accepted students. The existing testing system rewards those who cram, memorize facts, and thus neglect other essential elements of learning such as creativity, open-ended problem-solving, collaboration, and the like. Practicing his own emergent design, Dr. Chaianan adopted a rather brilliant strategy for working around the recalcitrance of the educational bureaucracy.

Stating that "Old bureaucrats never die, they just get by-passed," Dr. Chaianan is creating his own set of examinations particular to Vachiravudh. Since Vachiravudh College is prestigious enough, these examinations have respectability. He reasoned that if he could get prestigious universities around the world such as Cambridge and Oxford in the United Kingdom and MIT and Harvard in the United States to accept the results of Vachiravudh examination and educational practice, then the previously reluctant Thai bureaucracies would be forced to go along. In this way he would open up the process within Thailand.

4.4.3 Next Steps

Encouraged by the results of the first term of the constructionist third grade, plans to include adopt this method for both the third and fourth grade are continuing. Vachiravudh also continues to support efforts to help out public schools in the Bangkok Municipal Authority (BMA) as well as throughout the country and all Project Lighthouse sites in particular.

4.5 Summary

Each of the sites described in this section achieved learning goals beyond what they had been able to accomplish previous to Project Lighthouse. They are helping to serve as beacons of light towards new thinking about learning and learning environments in Thailand. Significantly, of the sites mentioned in this chapter the original project plan only specified work in Chiang Rai. The others were added via Emergent Design based upon compelling factors, primarily the interest of key personnel at the sites.

It is important to note that each site developed uniquely. While the underlying principles (constructionism, technological fluency, Emergent Design, project-based learning) within Project Lighthouse were applied according to the understanding of the people at each site, the activities, projects, organization varied depending upon the administrators, teachers, learners, community, and situation. The people were able to constructively develop their own sites. People at each site could pursue their passions. They developed relationships with different people from Project Lighthouse and appropriated and applied what they

learned with them. Emergent design transformed the unpredictable nature of how ideas would be adapted and put into practice from a bug to a feature.