EXTENDING ICT4D STUDIES: THE VALUE OF CRITICAL RESEARCH[1]

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The purpose of this paper is to demonstrate the value of critical research for information and communications technology for development (ICT4D) studies. Most previous IS research on ICT4D projects is interpretive and has focused on the immediate organizational context, but there are very few critical studies that have engaged in macro sociopolitical analyses regarding institutional change. Hence we extend previous IS research on ICT4D by adopting a critical research perspective on the macro sociopolitical context within which most ICT4D projects take place. We illustrate this with an ethnographic study of a project that was intended to improve the education and social welfare of the aboriginal people in Taiwan. On the surface the project was tremendously successful; it became a showcase on national radio and TV showing how ICT could be used to support underprivileged children. However, our research uncovered a different story altogether—a story of the aboriginal people themselves feeling marginalized and without much of a voice. We use concepts from postcolonial theory to make sense of these two contradictory stories. We found that the interrelationship between the macro sociopolitical context and the local organizational context of the ICT4D project is the key to understanding what went wrong, something which we would not have discovered if we had taken the traditional approach. The postcolonial context is powerful and pervasive, hampering any real progress.

Keywords: ICT4D, development, critical research, postcolonial theory

Introduction

Information and communications technologies (ICT) are considered by many development agencies to be critical to achieving socioeconomic progress for developing countries and disadvantaged groups (Dewan and Riggins 2005; Walsham and Sahay 2006). According to the World Bank, more

than USD $37 billion was invested between 1997 and 2007 for ICT development projects that were aimed at boosting economic productivity and delivering other benefits such as changing the culture and the ways people think, behave, and communicate (Brown and Grant 2010; Madon et al. 2009; Walsham 2005, 2012; World Bank 2008). However, several studies have reported difficulties in realizing the potential benefits of ICT for development (ICT4D) projects (Adam and Myers 2003; Avgerou and McGrath 2005, 2007; Letch and Carroll 2008; Miscione 2007; World Bank 2012). A high proportion of ICT4D projects are unsuccessful (IEG 2011).

Table 1.	Key Characteristics of Selected IS Articles about ICT4D			
Article	**Topic**	**Theory**	**Paradigm**	**Contextual Focus**
Bailur (2007)	Telecentres in India	Stakeholder analysis	Interpretive	Local
Braa et al. (2007)	Health information systems in developing countries	Complexity science	Interpretive	Local
Mbarika et al. (2007)	The digital divide and gender inequality in Kenya	Agency theory	Interpretive	Local
Miscione (2007)	Telemedicine in the Amazon	New institutional theory	Interpretive	Local
Puri (2007)	Constructing knowledge alliances in India	Communities of Practice	Interpretive	Local
Silva and Hirschheim (2007)	Strategic information systems in Latin America	Punctuated equilibrium	Interpretive	Local
Venkatesh and Sykes (2013)	The digital divide in India	Social networks	Positivist	Local
Kraemer et al. (2009)	One laptop per child: vision versus reality	Purely descriptive	Purely descriptive	Local and macro
Bass et al. (2013)	ICT use in Ethiopian higher education	Institutional theory and capability approach	Interpretive	Local and macro
Aanestad et al. (2014)	Health information systems in India	Automating and informating information infrastructures	Interpretive	Local and macro
Dasuki and Abbott (2015)	The evaluation of an ICT4D project in Nigeria	Capability approach	Interpretive	Local and macro

We used ethnographic research to study an ICT4D project that was, on the surface, tremendously successful. The project was intended to improve the social and economic welfare of the aboriginal people in one remote Taiwanese village. The mainstream story, sanctioned by the government and the media, praised the apparent success of this ICT initiative. However, our ethnographic fieldwork revealed a different story altogether; a story of the aboriginal people themselves feeling marginalized and without much of a voice. This aboriginal story of a failed ICT4D project was invisible to the mainstream.

Some IS scholars have suggested that the high failure rate of ICT4D projects is due to a lack of understanding of different underlying perspectives and context diversities (Avgerou 2008, 2010; Avgerou and McGrath 2005; Hosman and Fife 2008; Walsham 2012). We agree with this assessment. As Avgerou (2008) says, IS scholars have focused on the immediate organizational context, but rarely engaged in macropolitical analyses regarding institutional change. Table 1 classifies a selection of ICT4D articles by paradigm and the extent to which they consider the local and/or macro context.

As can be seen from Table 1, most ICT4D studies in information systems are interpretive, with very few positivist or critical research studies. Most have focused on the local con-

text of the ICT4D project, although very recently IS scholars have started to focus on the macro context. However, what is missing in previous work on ICT4D is an explicit theory that can address the macro-micro connection between the macro context and the local IS innovation. Avgerou suggests that a challenging task remains "to identify the context that matters and develop theory capable of addressing the interrelationship of context with IS innovation" (2008, p. 142).

This paper is a response to this call. Since critical research explicitly focuses on the interrelationship between the macro and micro sociopolitical contexts (Richardson and Robinson 2007), we use one type of critical theory—postcolonial theory—to explore this interrelationship. We suggest that the postcolonial context is a context that matters and that postcolonial theory is a theory capable of addressing the interrelationship between the macro sociopolitical context and the local organizational context of the IS innovation. Our findings show that the postcolonial context is powerful and pervasive, hampering any real progress at a local level.

Hence, the purpose of this paper is to demonstrate the value of critical research for ICT for development studies. We extend previous work by adopting a critical research perspective (Myers and Klein 2011) on the interrelationship between the local and macro sociopolitical context of ICT4D projects.

The paper is structured as follows: The next section discusses our theoretical framework. The following section describes our research method. The ICT4D project is then described from both the mainstream and aboriginal perspectives. An analysis of the findings then follows. The final section is the discussion and conclusions.

Theoretical Framework

Postcolonial theory provides a set of concepts for understanding the broader social and political aspects of development and underdevelopment in a global context (Ravishankar et al. 2013). Postcolonial theory, as one type of critical theory, also draws attention to larger concerns such as asymmetric power relations between groups of people and nations. In our study, the Taiwanese aboriginals have been the subject of colonization for over 300 years by the Spanish, Dutch, Japanese, and Chinese. The aboriginals have been marginalized both socially and economically, gradually losing most of their lands, language, and culture (Kuan 2010). The aboriginals also suffer from high unemployment and social problems (Kuan 2010). They have been compelled to construct their identity through the discourse orchestrated by the mainstream (Kuan 2010). Textbooks and the media frequently stigmatize the aboriginals as "drunk" or "lazy" (Hsieh 1987). Not surprisingly, the aboriginals also represent the ethnic group with the lowest rate of ICT usage in Taiwan (RDEC 2010, 2011). Given this macro-political context, we believe that postcolonial theory is particularly appropriate for understanding the progress and outcome of this ICT4D project.

Said, one of the earliest postcolonial scholars, argued that colonialism involves the perceived superiority, domination, and complex hegemony of a Eurocentric Western discourse over the Oriental world (Said 1978). This dominant discourse silences the discourse of the governed "subalterns" (i.e., those who find themselves marginalized and powerless; Young 2003). Following Said, different versions of postcolonial theory have emerged; for example, some focus on the identity and agency of the colonized in their resistance to the dominant discourse (Bhabha 1995; Rydhagen 2004; Spivak 1999).

Ashcroft (2001) points out that, although formal European colonialism ceased in the early 1960s, the term *postcolonial* more broadly refers to all culture impacted by imperialism from the moment of colonization to the present day "because the colonization does not stop when the colonizers go home" (p. 12). Postcolonial theory is particularly relevant to the subject of globalization and technology (Ashcroft 2001; Quigley 2009; Ravishankar et al. 2013).

Postcolonial theory is one type of critical theory and closely related to the work of Foucault. According to Foucault (1980), power/knowledge is a reciprocal, mutually reinforcing relation between the codification plus transmission of knowledge and subsequently the control of conduct. Foucault draws attention to the fact that people's interpretation of truth and associated actions are always governed by the orthodox doctrine or ideology established by those who possess power. People usually conform to generally approved beliefs or attitudes, and those who do not conform are often stigmatized.

In our case, the dominant discourse was that of the Taiwan government, after the Kuomintang fled from China and took over the government of Taiwan in 1945 (from the Japanese). Hence, our focus is not on the relationship between the West and the East (as is more typical of postcolonial studies), but rather on the relationship between the dominant Chinese culture of Taiwan and the Taiwanese aboriginals. Table 2 summarizes six concepts that we have adopted from postcolonial theory.

Research Method

The research method we used was that of critical ethnography (Myers 1997). Ethnographic research is one of the most in-depth research methods possible and seeks to place the phenomena studied in its social and cultural context (Harvey and Myers 1995; Myers 1999). Critical research in information systems (CRIS) "is concerned with social issues such as freedom, power, social control, and values with respect to the development, use, and impact of information technology" (Myers and Klein 2011, p. 17). CRIS looks at the complex relationships between information systems and their cultural, national, organizational, political, and social context of use (Kvasny and Richardson 2006). Given that our theoretical perspective was informed by postcolonial theory, critical ethnography was deemed to be the most appropriate kind of ethnography to use because it reveals and challenges prevailing beliefs and social practices (Myers and Klein 2011).

Our research began in October 2006, when Principal L invited us to evaluate and offer suggestions for the ICT4D project. In December 2006, we visited his village and started our fieldwork. Thereafter, one of the authors conducted intensive fieldwork among the local aboriginals from December 2006 to September 2008. The ethnographic fieldwork covered the time from project deployment to post-completion. Numerous visits were made to the research site and lasted between 3 and 7 days each time (the village is only a two-hour drive from the nearby city of Kaohsiung). Multiple qualitative data sources were collected to ensure an in-depth understanding of the phenomenon, including documents, field notes, videos, and

Table 2. Summary of Postcolonial Theoretical Concepts		
Theoretical Concepts	**Definition**	**Research Focus**
The Mainstream	People who are at the center of culture, knowledge, and civilization, with most of the power and resources (Ashcroft et al. 1998; McLeod 2000).	The social context, resources, and actions of the ICT4D project donors.
The Subaltern	People who are outside of the mainstream and are at the margin of culture, power and civilization. The subalterns tend to be stereotyped as lazy, drunk, passive, dependent, and digitally illiterate (Ashcroft et al. 1998; Said 2001).	The social context, resources and actions of the Taiwanese aboriginals.
Paternalism	The attitude of the mainstream toward the subaltern: The mainstream assumes they have the right and obligation to assimilate (help) those at the margin, often without any consultation with the subaltern. This way of thinking reflects a paternalistic ideology (Ashcroft et al. 1998; Fanon 1963; Said 2001).	The donors' attitude and approach to the Taiwanese aboriginals during the ICT4D project.
Hegemonic Discourse	An all-powerful discourse that shapes social reality: the interventions of the mainstream are seen as morally and intellectually correct. These interventions reproduce and reinforce the existing social and political structure (Foucault 1980; Gramsci 1971; Rajagopal 2003; Torfing 1999) .	The mainstream story of the success of this ICT4D project is sanctioned by the government and the media.
Ambivalence	The subaltern's ambivalent attitude toward the values, culture, and beliefs imposed by the mainstream (Ashcroft et al. 1998; Bhabha 1994).	The reaction of the Taiwanese aboriginals to the ICT4D project.
De-voiced	The subalterns do not have an effective voice to speak for themselves (Ashcroft et al. 1998; Spivak 1999).	The story of the Taiwanese aboriginals with respect to the ICT4D project is ignored by most people.

Table 3. Interviews and Role of Interviewees		
Role of Interviewees	**Number**	**Interviews**
Principal L	1	6
Local Minister	1	3
Teachers	7	16
Parents	14	17
Students	11	4

photos. The documents included government reports, newspaper and magazine reports, and reports from nongovernment agencies, whereas most of the videos and photos were taken by one of the authors. As well as many informal discussions, 46 semi-structured interviews were conducted with informants from the various stakeholders (see Table 3). Follow-up discussions were arranged if needed to clarify any matters. As the ethnographer is Chinese, Mandarin was the language used during the interviews. All the interviewees could speak Mandarin.

Initially, our study focused on assessing the ICT4D project. We were positive about the project, believing that it could help the villagers. For the first few months the field researcher was treated politely but with some distance. Without

really knowing this at the time, she mostly heard the official version of the story from virtually all stakeholders (including the aborigines) as she was seen as an ICT expert assisting Principal L. She sensed that there was more going on than met the eye, but no one said anything to puncture the official story of success. The researcher, therefore, put in considerable effort to convince the villagers that she did not work for Principal L; she was an academic who would try to be honest in assessing the ICT4D project. In an attempt to gain the trust of the aboriginal villagers, she offered to help solve some of the villagers' practical problems. Gradually, villagers started to see her as an independent ICT expert who might help them (e.g., she was able to improve security on some of their PCs). It was only after one full year, however, that the villagers began to say what they really thought about the ICT4D pro-

ject. Whereas they were reluctant to express any criticisms of the project at the start, later on they were much more forthcoming. Hence it was only during the second year of fieldwork that the ethnographer and research team developed a more nuanced understanding of the issues. Our perspective changed from one of simply assessing the ICT4D project to one that was more critical.

A comment from the provost of TY school illustrates this change in perception by the villagers. The provost admitted that he had put the researcher in the worst room at the school at the beginning of her fieldwork because he thought that she was Principal L's helper. He believed that the ethnographer was in effect a lobbyist who would try to convince them to accept L's project. Hence he was hoping that the poor arrangements for the researcher would convince the researcher to conduct the research somewhere else. He said,

> *I am sorry that I put you in the worst room the first time you came here. I thought you were here to help L convince us [about the project]. But now, we know you are not.*

From that moment on, approximately one year after the start of the fieldwork, he began to share his thoughts and concerns about the project.

In order to analyze our primary and secondary data, we first of all used narrative analysis to organize in chronological order the most significant events of the ICT4D project ((Myers 2013). We then followed the approach outlined in Walsham and Sahay (1999). This involved analyzing the qualitative data to identify relevant codes. The codes were then categorized according to various themes and concepts. We repeatedly examined and compared the material both within themes and across themes in order to identify those that we considered to be the most important. The final phase was to organize these themes according to the six concepts of postcolonial theory summarized in Table 2.

We will now describe the ICT4D project and its context. Please note that, due to the sensitive nature of this research project, all names used are pseudonyms. Also, all qualitative data (text of interviews, documents, etc.) have been translated into English by the authors.

The Research Site: TY Village ▬▬▬▬

TY village has about 350 households and 1,500 aboriginal people of Bunun ancestry in a remote mountain area. The traditional language and culture of Bunan is vanishing as fewer and fewer inhabitants are able to speak it. Facing limited job opportunities and a critical economic situation, most of the village's middle-aged adults are compelled to leave the village to work in the cities. Consequently, many children are raised by their grandparents.

TY village has one elementary school. At the time of this study, TY School had 124 students and 10 teachers and staff in total, 7 of whom were permanent and 3 were temporary. Of the seven permanent teachers, five are aboriginals, while the other two are non-aboriginals who have lived there for over five years (we regard the non-aboriginal teachers as subalterns, given that they lacked power and resources as far as the ICT4D project is concerned. They also tended to identify with the aboriginals, even though they were originally from the mainstream Chinese culture). The school lacked many facilities and equipment. In addition, it was faced with a severe manpower shortage and a high rate of teacher turnover for the temporary positions.

Before the ICT4D project began at TY School, there were 20 computers, five of which were not working. Fewer than 10 families owned computers, partly because of the high cost for buying one, and partly because of their worries about possible ICT misuse.

The ICT4D Project at TY Village

The improvement of disadvantaged people's state of welfare through ICT has been a goal for the Taiwanese Government for over 20 years. Both the Ministry of Education (MOE) and the Council of Indigenous Peoples (CIP) of Taiwan have invested in ICT-related projects in order to narrow the digital divide. Since 1988, the national MOE has invested resources in ICT education projects aimed at upgrading the ICT infrastructure and establishing cyber-learning systems to narrow the digital divide. Academia, local governments, and private businesses have also been encouraged to conduct ICT-related education programs.

In August 2006, Principal L arrived at TY elementary school. As a 20+ year veteran of education, L was a provost in an urban school before joining TY elementary school. Being the new principal of this remote aboriginal school, L was eager to help both his school and TY village. Thus, in late 2006, Principal L participated in the "Integration of ICT into Teaching: Models, International Interchange and Diffusion" project, a national education venture promoted by MOE. L raised over seven million Taiwanese dollars from several public and private business and organizations for the project. Combining the resources from MOE, local government, one national university, and public and private businesses, L's

Table 4. The TY ICT4D Project				
Start Date	**Phase**	**Goals**	**Sponsor**	**Progress**
September 2006	Free computers and wireless communications	To establish basic ICT facilities and narrow the digital divide in TY village	Local county government and two national companies	Wireless hubs installed in early 2007, and 27 computers were distributed in December 2007
December 2006	International collaboration	To help aboriginal students be proud of their Bunun culture and to be globally connected	MOE and two Japanese elementary schools	Visit Japanese school in 2007, and one Japanese partner school to visit TY in 2008

ICT4D project included two main phases: (1) free computers and wireless communications and (2) international collaboration. In the summer of 2008, indicating the establishment's belief in the success of L's ICT4D initiative, TY School received an A-grade in the national school evaluation. However, this evaluation was based on the new IT infrastructure and processes (i.e., inputs) rather than any actual improvement in educational outcomes, however. Table 4 summarizes the two main phases of the TY ICT4D project.

The Overwhelming Success of the TY ICT4D Project

To the outside world, the TY ICT4D project appeared to be tremendously successful. It became a showcase on national radio and TV showing how ICT could be used to narrow the digital divide and support underprivileged children.

No More Digital Divide

By the end of 2007, four hubs were set up and 40 used computers were donated, of which 27 were distributed to student families. A ceremony was held to celebrate the donation of used computers from two large businesses. TY School now began to be touted as a successful model for narrowing the digital divide in aboriginal communities. More than a dozen stories appeared in newspapers, on radio and on TV. The media reported that computer ownership in TY School had reached 100 percent, saying that the digital divide in this community was narrowed and the project had enabled students to extend their learning at home and helped parents to broaden their horizons.

No More Barriers to Reach the World

Media coverage about the international collaboration in TY School started in early 2007. One TV program reported that TY students, despite their poor economic status and remoteness, had built up friendships and shared Bunun culture with their Japanese counterparts. Another story claimed that the

international collaboration had helped students to develop better English competency and expanded their international vision. Many officials of MOE and local government visited TY School and were reported to be amazed that aboriginal students could share their culture. The following is the transcript of a 2007 TV news program funded by the Ministry of Education:

> *[TY], located in Kaohsiung County, is a typical aboriginal village. It is remote and far....When it rains, the road can be muddy and conditions can be bad. Besides, the economic status in the village is not good. It is not easy for villagers to be connected to the outside. However, [TY] children can now collaborate with urban students, even with Japanese students without any barrier through the Internet.... Through the Internet, not only do the students learn Japan culture but they also introduce their own Bunun culture to Japanese partners. They experience digital technology and, at the same time, there are no more walls in school and no barriers to reaching the world.*

The Only Aboriginal School with Successful ICT Education

A large number of schools began closely monitoring Principal L's initiative in the hope of learning from his best practices. There were more than 20 stories in newspapers from 2006 to 2008 plus special reports on three TV stations and two radio stations. In these stories, both Principal L and TY School were lauded as a successful model of the integration of ICT and education. With no stories about successful ICT initiatives in other villages, TY School became the only aboriginal school in Taiwan that was considered to have successfully deployed ICT to support education. At the end of the ICT4D project, Principal L was proud of what had been achieved:

> *I was thinking what I had done for this school. You know, how many times has this school been in the press since I came? Thirty times! From January to*

June this year, I have raised more than seven million in cash and resources. All of this should make our teachers proud.

The Two Stories of the TY ICT4D Project ▆▆▆▆▆▆

Having summarized how the project was seen by the outside world, we will now present two sets of narratives for each phase of the project: the mainstream story and the aboriginal story.

Phase 1: Free Computers and Wireless Communications

The Mainstream Story

The aboriginals haven't even seen it or thought about it. As TY had limited ICT resources, Principal L thought that setting up a wireless network and giving away free computers were essential. He said,

> *I think that the digital divide here is a serious problem. How can it [the digital divide] be improved if we cannot even see any computers around?*

He said that the aboriginals "*haven't even seen it [ICT] or thought about it,*" but he could see its potential for improving their lives:

> *The digital divide is dreadful here in the villages.... I want to build up the first (aboriginal) ICT and education system of Taiwan.*

A project to help everyone. Principal L believed that every family in the village should have a computer at home. Parents would realize "*that ICT is an essential tool for learning*" and the digital divide would be narrowed. However, the ICT4D project was not just an educational project for the school; rather, he believed it was a project to improve the social and economic welfare of the whole community:

> *My project does not only cover the students in school; I also want to include parents and community members....This is not only a school project, but also a project for the whole community.*

Don't worry! Just follow my orders. Despite several teachers expressing some confusion about the goals of the project, Principal L was confident that his project could work. He explained:

> *Some teachers asked me what the meaning of those activities is. I said to them: you don't have to worry about this. Just follow my orders. At the end, I will make sure that the project outcomes look good and successful. I want them to be proud of themselves.*

After holding two parent meetings to explain his project, Principal L completed the set-up of wireless hubs in early 2007 and received 40 used computers from two companies in September 2007. The teachers were made responsible for delivering the computers to families.

The Aboriginal Story

We cannot hide from ICT. Before the ICT4D project, TY parents' and teachers' experience of ICT in TY village was mostly negative. Parents believed that the children spent far too much time in the Internet Café playing games, making them worried about the effect of the Internet on their education.

Having learned about the negative opinions of some villagers, Principal L approached the opinion leaders in the village for support. The church minister, an aboriginal himself, had served for more than 10 years in the village and was influential. Hence, Principal L held several meetings with him to explain how ICT could benefit the whole village. The minister was eventually persuaded, saying

> *At first, residents were against ICT. They didn't want to have anything do with it. They thought that ICT was bad. I told them that they could not hide from it. ICT was already here and we had to face it. Therefore, I showed them some photos and information on the Internet during the Sunday service and made them understand that ICT could be good.*

Free computer is a gift from God. The endorsements from the local minister and opinion leaders meant that TY villagers relented in their opposition to the ICT4D project. The offer of free computers softened their stance even more. Although still concerned about their children's addiction to computer games, several parents now became excited about the free computers. One said, "*Of course, we welcome free computers. They are free. They are just like gifts from God.*" Some parents that we interviewed at this time now said that they supported the ICT4D project. They understood that ICT was critical for their children. One mother said,

> *The computer is very important. This is how the world outside our village works. The computer is a "must-learn" for our children.*

Like the parents, the teachers in TY school now began to proclaim the importance of ICT. As one teacher commented,

> *We used to punish students for playing computer [games] in the Internet Café....We thought it could affect students' learning. However, we have to admit that students should know how to use computers. Nowadays, computers are very important and helpful for students.*

Since some parents were still opposed to the ICT4D project, the minister asked them to keep their opinions to themselves:

> *I asked them keep their opinions to themselves and not to show up [at the meetings]. Some of them had no children and could not understand how important ICT was to children. I can't let them affect other parents and slow down this process.*

Despite some opposition, on the whole an inspiring atmosphere pervaded the village at the start of the project. Principal L promised them a bright future. The ICT4D project was the way forward.

I am too old to learn computers. Although most parents now recognized the importance of ICT for their children's education, they still held back from adopting ICT themselves. Several parents said that after working all day, they were too tired to learn how to use a computer. Following are comments from several parents:

> *I am too old to learn computers. There is no way I can keep up with the kids.*

> *After working all day, it is really late and learning the computer. I will be too tired.*

> *For us at this age, you ask us to learn the computer? For what?*

What if I break the computers? When free computers finally arrived, parents found out they had to participate in school activities compulsorily and return the computers after their children's graduation. These rules regarding computer use were promulgated without any consultation with the parents. Many parents, worried about the responsibility and cost to repair school computers, turned down the offer of free computers. As one parent commented,

> *We have to sign a statement in order to get a used computer. The statement is to show that the computers have to be returned when our kids graduate from school, and that parents will support and join*

> *the activities that are held by the school....What if I break the computer when I use it during these two years? Maintenance could cost a lot.*

As a result, 13 out of the 40 used computers that were donated were left idle at school.

We have given them computers. Don't they think that they should.... When the parents had difficulties with configuration of Internet access or computer hardware problems, they often requested help from the teachers. However, the teachers felt frustrated because setting up the computers took up a lot of their time. One teacher commented:

> *Parents kept calling us as soon as they had problems. How can we handle it? Am I responsible for it? If I have to go to solve those problems for parents, I have to use my own time, after school....Parents should try to solve problems by themselves. We have given them computers. Don't they think that they should do something themselves if they really want to use ICT that badly?*

Although the extra workload for teachers was due to the lack of local ICT support, some of the teachers now started to blame the parents themselves for their lack of ICT literacy skills. The teacher quoted above, for example, assumes that the parents "want to use ICT badly" but the ICT project was not their idea in the first place.

We need a brand new one. Most of the donated computers were now just sitting idly at home, either because the computers were installed with out of date software, or because the wireless Internet remained inoperable. Given that the wireless Internet remained unusable, parents turned off the hubs to save on electricity. Without the Internet at home, students chose to go to the Internet Café instead. Without the requisite skills or knowledge about ICT, the free computers were no longer seen as a gift from God. Rather, some parents felt that they should buy a brand new one themselves. Although the parents had never requested a PC before, now they felt obliged to buy one for the sake of their children.
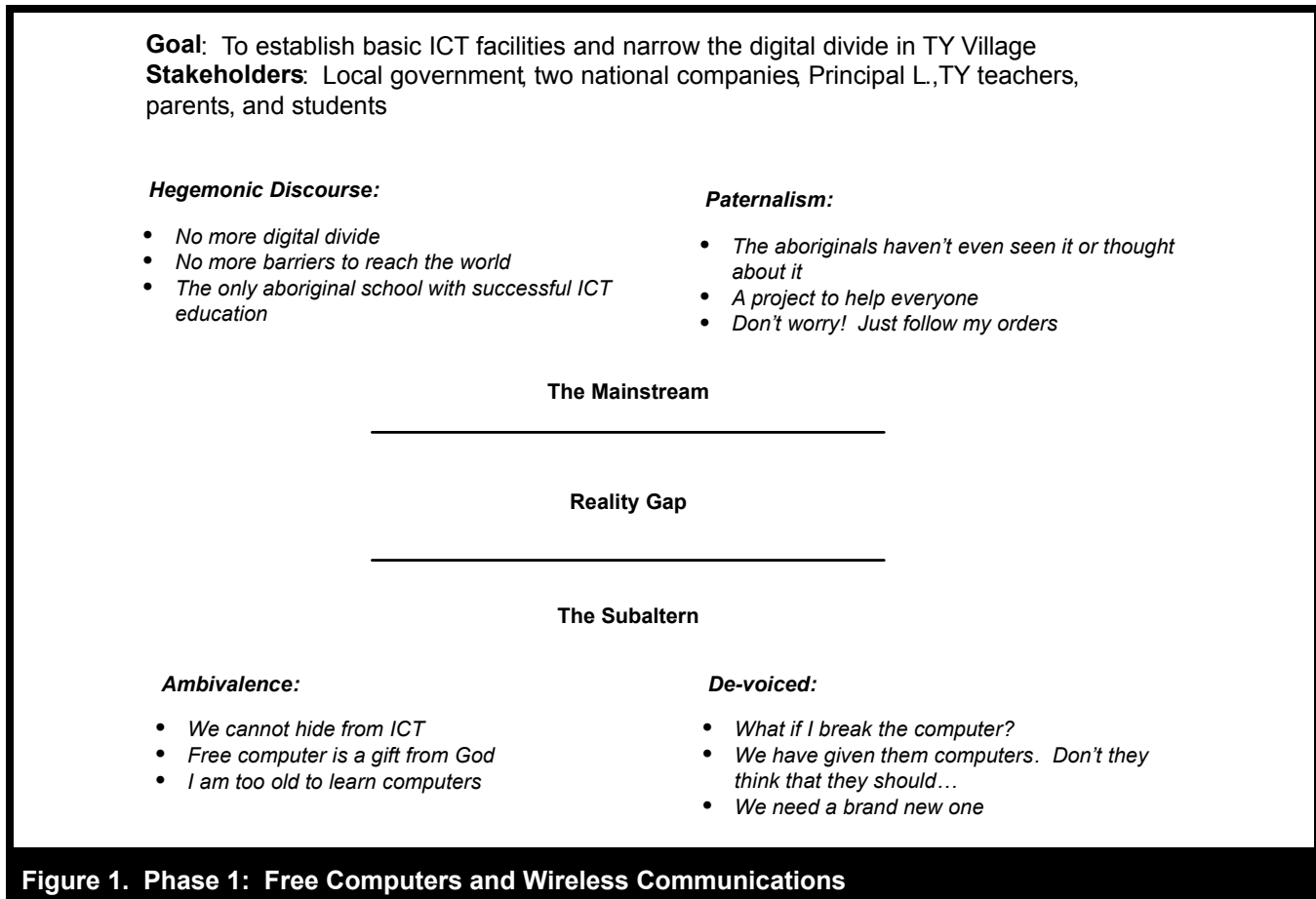
Figure 1 summarizes Phase 1 using some of the concepts from postcolonial theory.

Phase 2: International Collaboration

The Mainstream Story

A project to step out and make connections. The international collaboration project aimed to encourage aboriginal stu-

Goal: To establish basic ICT facilities and narrow the digital divide in TY Village
Stakeholders: Local government, two national companies, Principal L.,TY teachers, parents, and students

Hegemonic Discourse:

- *No more digital divide*
- *No more barriers to reach the world*
- *The only aboriginal school with successful ICT education*

Paternalism:

- *The aboriginals haven't even seen it or thought about it*
- *A project to help everyone*
- *Don't worry! Just follow my orders*

The Mainstream

Reality Gap

The Subaltern

Ambivalence:

- *We cannot hide from ICT*
- *Free computer is a gift from God*
- *I am too old to learn computers*

De-voiced:

- *What if I break the computer?*
- *We have given them computers. Don't they think that they should…*
- *We need a brand new one*

Figure 1. Phase 1: Free Computers and Wireless Communications

dents to "step out" and make connections to the outside world through cooperation with foreign schools. Principal L's plan was mainly for students in the fifth and sixth grades to collaborate with Japanese students through the Internet. English was chosen to be the language of communication. Principal L believed that TY students should build up their competence in interacting with foreign students and develop global perspectives:

> *The reason I conducted the international collaboration is because I wanted to give them a stage to show their development. Since then, TY students have their own international platform, here in the village, not abroad.*

I have prepared everything. Based on his previous experience, Principal L was confident that the international collaboration would be easy to carry out. Principal L established a partnership with two Japanese schools.

However, the fluency of TY students and teachers in English was very limited. For this reason several teachers suggested

Principal L postpone the collaboration. Principal L, by contrast, believed that the students and teachers were ready, stating

> *The teachers should not complain about the international collaboration. I have prepared everything for teachers. I found partners for them. I had someone set up hardware. I even told them how long the collaboration should be and what to do....*

> *I have made myself clear to teachers: I told them that I didn't expect much. I know that collaborating for 30 seconds will be the limit for the students.*

They can't see my vision. Faced with disagreement from many of the teachers, Principal L said, "*They can't see my vision.*" He believed that the limitation of English ability could be overcome if the conversation was kept short. He also did not think that he was expecting too much of the teachers. Sensing that he was misunderstood, Principal L grew increasingly insistent that the teachers should complete this project:

Actually, it is me who insists to conduct international collaboration. The most important reason for it is [so] that students can learn different languages and develop the ability to learn spontaneously.

Since the international collaboration with Japanese students began in late 2006, TY School has increased the number of partners to six schools, including schools in the United States and Vietnam. It has conducted online collaborations with Japanese partners more than 20 times. In February 2007, Principal L led a delegation of TY students, teachers, and parents along with two university professors, to visit two Japanese partners.

The Aboriginal Story

To get a picture of the real world. Recognizing the fact that the villages were remote and isolated, and that the students had limited information resources for new knowledge and technology, parents and teachers looked forward to being connected to the outside world. As one parent said,

Our kids do not know information other than in textbooks. We don't have newspapers or magazines here. Kids have no way to know the outside world. However, computers can help children to search information and to know the outside world.

A teacher commented,

They need it! The Internet is the only way for children to reach out as they cannot go to urban areas often....They will not stay here for the rest of their lives. Therefore, more stimulation is needed for them to get a picture of the real world and to adapt themselves to new conditions.

Students' three words: "Hello, yes and no!" The international collaboration project now became a show to demonstrate the value and importance of "stepping out" for the aboriginals. However, the limitation of English ability became an obstacle. One teacher commented:

The students can't collaborate....When you can't speak English at all, how can you communicate with Japanese students...? We all know we are acting in a play. When we had visitors, we performed the international collaboration. When TV stations came, we showed them our international collaboration. When the director of the authority came, we collaborated, too. International collaboration is no longer teaching; it is a show, a program.

When the collaboration started, students stood in front of the web camera and began their conversation with "Hello," in English, before exchanging names with their Japanese partners. The Japanese students always raised questions, but TY students admitted that they did not understand what their Japanese counterparts said. TY students often could not answer the questions and continuously turned to their teachers for help. They were only able to muster one word answers such as yes or no.

During our fieldwork, the MOE financed a special TV program to cover the ICT4D project. A TV reporter admitted to us that the collaboration had not been as impressive as he had expected, stating

It is obvious that the students couldn't answer those questions....The teachers had to tell them the answers all the time and the students were probably just repeating the sound. Did you notice that? Their answers were very short. Usually, they only answered "yes" or "no." I don't remember them asking any questions....This is not good for my story.

However, the reporter explained that he had to present the story from a positive stance.

We bid for this project from the Ministry of Education and they have set certain guidelines for us. They are quite strict....They only want to have a positive story.

Hence, while the aboriginal parents and students were initially interested in learning more about the world outside, they now started to become ambivalent about the extent to which the ICT4D project would lead to any meaningful interaction.

Debt and doubt. The parents appeared to have limited knowledge of their children's ICT-related education activities, although in our interviews some parents said they were glad that Bunun culture had been seen overseas. As one parent said,

When I thought about our school, I was so proud of it. I shared our international collaboration at a graduation ceremony of another aboriginal school and I was so glad I cried during my speech.

The trip to Japan to showcase Bunun culture reinforced the impression that ICT-related activities were the way to be connected. In 2007, when Principal L led the trip to visit their Japanese partners, the students were keen to go, although many parents had to borrow money for the trip. Several

parents were still paying off their loans some two years later. Hence many parents were now in debt and doubted whether a trip to Japan was in fact the best use of their money.

We are very tired. When visitors came to the school, Bunun dance was always the first performance at the beginning of each session, followed by the international collaboration. Teachers and the sixth-grade students had to practice their traditional dance on the school playing field. After hours of practicing, the students were exhausted. The students also complained that it was becoming boring, with one stating

> *We are tired of being on TV; we don't like to be on TV. It is boring. Every time, we have to do the same thing, dance, talk to Japanese. That is it.*

When students were asked by the media or outsiders about the value of the international collaboration, they always gave the "right" answers: "*It is good for us to experience different a culture*" and "*We want to study in Japan when we grow up*." The students thus in effect mimicked what they had been told by the school or local ministers, although they were slowly becoming apathetic and uninterested in performing for TV.

It is too much for us. In addition to the students' poor English, teachers discovered that the international collaboration encroached upon their regular school program, especially when visitors turned up unannounced. Sometimes their courses had to be cancelled or rescheduled because the international collaboration always seemed to take longer than expected. When teachers realized that their students were falling behind in their studies, they become concerned about the possible negative consequences. One teacher explained:

> *We should have eight-hours of classes today, but we can only teach for one hour because the international collaboration has taken up all the class time. However, we don't have a choice. Sometimes, I really want to ask him [the Principal] to stop all the activities....Now it is just too much for us.*

Teachers also complained about the late notice, which all the teachers felt was inconvenient. One teacher said:

> *We were told this morning that we would have to perform the traditional dance for TV reporters. I mean this morning, at eight o'clock! Why couldn't he have told us earlier?...He just comes in this morning and gives his order. As a consequence, what we planned to do and teach today has been ruined just because he wants to have media coverage.*

On several occasions, the teachers attempted to talk to Principal L about these issues, but they were unable to convince him. Frustrated, a teacher commented

> *The problem is he only does what he wants to do....Our teachers have tried to communicate with him many times.*
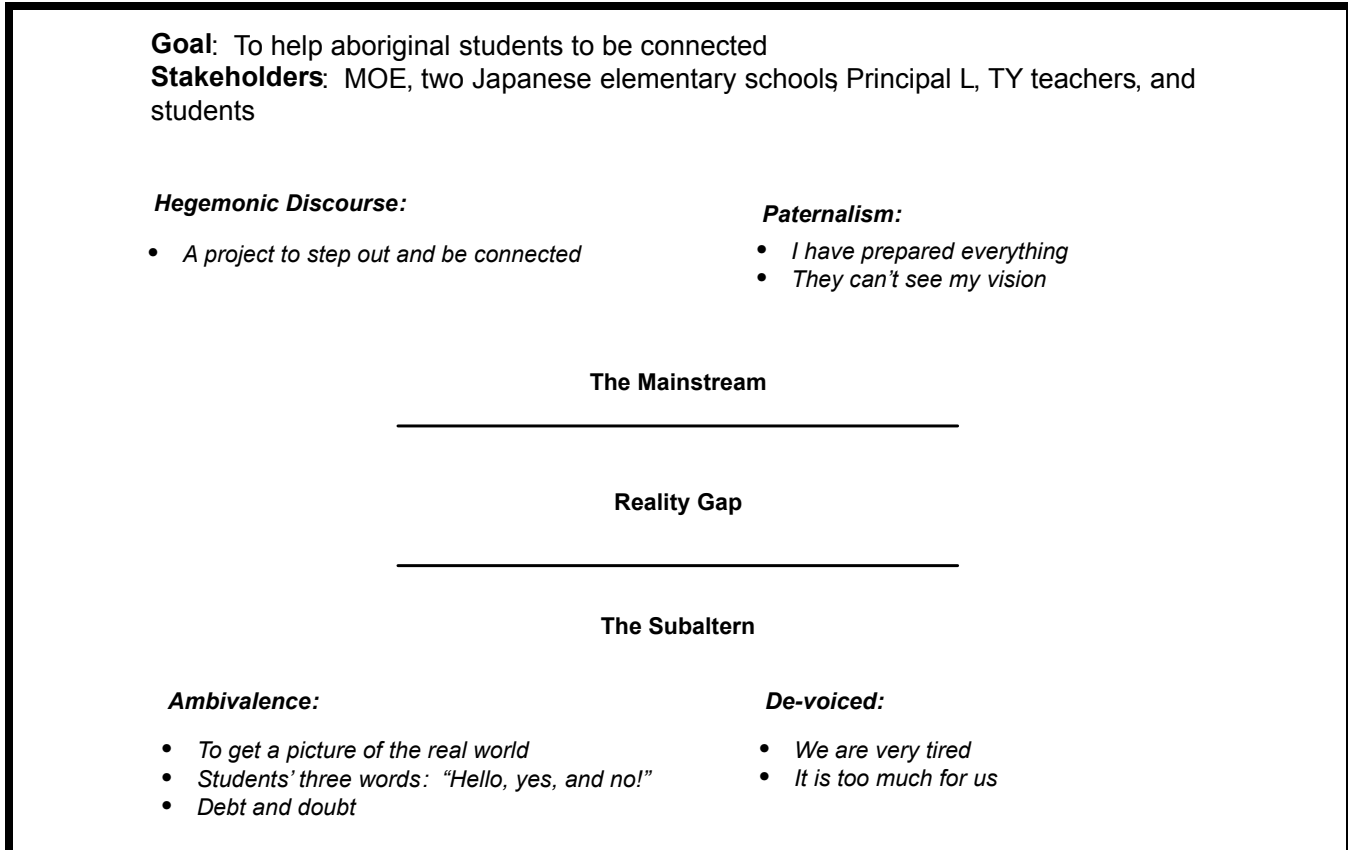
After several attempts to communicate with Principal L had failed, the teachers were now mired in ambivalence. On the one hand, they wanted to believe in Principal L's vision about the ICT4D project at TY village and so they collaborated willingly to keep the show on, but, on the other hand, they became concerned about the students' falling behind in their school work. They believed it was too much for them to teach and help with the ICT4D project as well. The worst part was they felt they had to follow Principal L's orders simply because he was their boss. Since Principal L was well connected with the educational establishment (for example, he was completing a doctoral degree in education, actively participated in educational conferences, and enjoyed good relations with officers from the education department), he believed he was right and any resistance was irrational.

Figure 2 summarizes our findings from the international collaboration phase.

An Analysis of the ICT4D Project

Our study has revealed two contradictory stories about an ICT4D project in a remote Taiwanese village. On the one hand, the project was seen as so successful by the mainstream that it became a showcase on national radio and TV, demonstrating how ICT could be used to support underprivileged children. This project was a case study of best practices for narrowing the digital divide. The success was attributed to having many critical success factors in place, such as top management support, great vision, strong early user commitment, and sufficient resources from government, business, and charity organizations. The reputation of the principal who led the ICT4D project was greatly enhanced, with the media praising his vision and effort. The digital divide in this aboriginal village was reported to have been narrowed.

On the other hand, the aboriginal story—which we only learned after one year of ethnographic fieldwork—was completely different. This story was one of nervous students struggling to communicate in English and tired of frequent visits by outsiders; overworked teachers who were plagued with additional tasks; and parents whose opinion about the ICT project shifted from being "a gift from God" to "ICT is not for me." However, this alternative story remained hidden

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Goal: To help aboriginal students to be connected
Stakeholders: MOE, two Japanese elementary schools, Principal L, TY teachers, and students

Hegemonic Discourse:

* *A project to step out and be connected*

Paternalism:

* *I have prepared everything*
* *They can't see my vision*

The Mainstream

Reality Gap

The Subaltern

Ambivalence:

* *To get a picture of the real world*
* *Students' three words: "Hello, yes, and no!"*
* *Debt and doubt*

De-voiced:

* *We are very tired*
* *It is too much for us*

Figure 2. Phase 2: International Collaboration

from the mainstream. We searched for negative stories in newspapers and the media but did not find any. The dominant discourse in Taiwan, of ICT being a magic cure for the under-served, means that it remains hidden today.

We will now analyze this ICT4D project using the six concepts from postcolonial theory discussed earlier. These concepts are the mainstream, the subaltern, hegemonic discourse, paternalism, ambivalence, and de-voiced.

The Mainstream

In Taiwan, the Mandarin-speaking Chinese have dominated social and political systems since World War II. This ICT4D project started with an eager principal with knowledge, power, and resources to help his school and the aboriginal village. Principal L, from the mainstream Chinese culture, was previously successful in applying ICT to educational settings and received substantial support for the project from various institutions. Hence he believed that he could dupli-cate his prior ICT success to enlighten the TY villagers. As

Baaz (2005) points out, the mainstream tends to generalize their experience and impose it on others. However, Principal L, while seemingly aware of the colonial legacy, did not fully appreciate its depth (i.e., the aboriginals' low literacy levels, their economically depressed state, disjointed social structure, and lack of knowledge to support ICT). Subsequently, he could not understand their ambivalence: why villagers said they supported the ICT4D project, and yet refuse to actually use computers themselves.

The Subaltern

In this particular situation the subalterns are the Bunun aboriginals of TY village in Taiwan. The aboriginals of Taiwan have been at the margin throughout Japanese and Chinese rule and are among the poorest people in Taiwan. Their languages and culture are rapidly disappearing, and they have the highest unemployment rate of all ethnic groups. The aboriginals also have the lowest rate of ICT usage in the country. For TY villagers, the ICT4D project was like a gift from God but the computers were also beyond their ability to

learn and maintain due to the imbalance of power/knowledge. Unfortunately they tended to be blamed for the failure of the project with comments being made such as, "*We have given them computers. Don't they think that they should [learn and use them]*."

Hegemonic Discourse

In recent years Taiwan's mainstream intuitions, including government agencies, large national businesses, and charity organizations have envisioned and promoted ICT as a cure for uplifting the aboriginals from their social and economic situation. This all-powerful discourse, sanctioned by Taiwan's mainstream institutions and media, praised ICT4D in general and the success of this ICT4D project in particular: the digital divide being overcome, no more boundaries to the world, and aboriginal students learning from digital content using ICT. To both the mainstream and the aboriginals involved in the TY ICTD project, this powerful discourse was seen as being far superior to the local knowledge of the aboriginals. As a result, events related to the ICT4D project were positively reported, with any objections seen as unimportant. As one TV reporter admitted to us, he was under strict instructions to tell a positive story only. It took one full year of fieldwork before we discovered the aboriginal story.

Paternalism

In the postcolonial context, the mainstream sees itself as having the responsibility to use its resources and power to help the economically deprived and ICT-illiterate subaltern. Principal L, like many in the educational establishment, believed that ICT was the solution to the problems facing the aboriginals, who were isolated from the wider world and victims of the digital divide. With support from academia, government, and private businesses, Principal L was there to help. The ICT4D project he initiated should help the aboriginals to step out into a global world and reduce the digital divide. When confronted with any problems or opposition, Principal L believed it was because he was misunderstood. If only the local aboriginals and teachers would follow his plan, they would soon come to see that the project was worthwhile.

Ambivalence

The local aboriginals had ambivalent feelings toward the ICT4D project. At first, parents saw the free computers as a gift from God, but in the end they could not see any benefit. They were happy to see media coverage of Bunun culture, but many parents ended up going into debt. Teachers wanted to believe that ICT could help student learning and lessen the

digital divide, but in the end they felt that the project was not worthwhile and took valuable time away from doing school work. The students loved computer games but were not interested in using computers for learning. All three parties (parents, children, and teachers) wanted to believe the rosy promises but they became apathetic toward the end of the project.

De-voiced

The feedback and complaints from aboriginal parents, teachers, and students were superficially noted but essentially ignored. This alternative story, never reported in the media, contrasts significantly with the hegemonic discourse of the mainstream. Postcolonial scholars have suggested that there is often no way for politically marginalized subaltern groups to voice their opinion (Ashcroft et al. 1998; Spivak 1999). As observed by Said (2001), under the dominant discourse and homogenization of colonization, marginalized groups are often overlooked as "a mere cipher in the landscape." In the case of this ICT4D project, the voices of the subaltern were met with attitudes like "they do not know my vision" and "they are complaining now, but in future they will thank me." For example, the international collaboration subproject was praised as an example of aboriginal students stepping out, becoming global citizens, and sharing their culture with the outside world. Unfortunately, the aboriginal villagers themselves thought that the international collaboration was just a show with no collaboration of any real substance.

Discussion and Conclusions ▬▬▬

In this paper we have attempted to demonstrate the value of critical research for ICT4D studies. We have used concepts from postcolonial theory to analyze one ICT4D project. The contributions of this article to the IS research literature on ICT4D follow.

First, our critical research approach has extended previous research on ICT4D by focusing on the interrelationship between the macro sociopolitical context and the local organizational context of the ICT4D project. In our case, the postcolonial context acted like a powerful yet invisible cage that blinded both the mainstream and the subaltern. This context is invisible because the mainstream supremacy is believed to be virtuous, the paternalistic governance of the mainstream is seen as a necessary factor of success, and the voice of the subaltern is not taken seriously. However, many ICT4D projects take place within such a developing-country context. Whereas most previous ICT4D studies have focused on the immediate organizational context—for example, by looking at those factors or processes that occur within a project (such

as user resistance, the process of systems development, or project management) or at least those are closely related contextually (such as top management support)—critical research focuses on the wider sociopolitical context. As we saw earlier, this wider macro-political context has usually been ignored in IS studies on ICT4D (Avgerou 2008), and yet this wider postcolonial context is *the key* to the whole story (or rather, the two stories).

Second, our findings have revealed the power of the hegemonic discourse of the mainstream. This discourse is evidenced in Taiwan's Ministry of Education White Papers that insist on Western standards as the ideal model for Taiwan schools. This discourse espouses ICT as a magic cure and is constantly repeated by the mainstream and mimicked by the subaltern. In this case, the users did not resist, as is commonly found in many implementation studies. Rather, they initially considered the ICT4D project as "a gift from God." However, when they eventually concluded that they were no better off than before, the aboriginal perspective was distorted and ignored, while the hegemonic discourse of the mainstream prevailed. Our application of postcolonial theory thus reveals that the problems associated with this ICT4D project were so deeply entrenched and of so longstanding a nature that the project was not just a failure, it actually reinforced the existing situation and made things worse. The sociopolitical context in developing countries is not something that can be magically removed or overcome by implementing ICT.

Third, our critical research approach has demonstrated the importance of "revealing and challenging prevailing beliefs and practices" (Myers and Klein 2011). Given that this is one of the principles of critical research, it suggests that IS researchers conducting critical research have a responsibility to speak up if the situation warrants it, even if this means going against the prevailing orthodoxy. We hope this paper serves as an example.

Fourth, our findings reveal that capturing local knowledge is important but not sufficient. In his study concerning an ICT4D project of telemedicine system in northeastern Peru, Miscione (2007) says that failure to take account of local health knowledge compromised the benefits of the telemedicine system. He suggests that

> it is important that the organizers of development initiatives design and carry out their efforts taking local knowledge into account, even when the knowledge is implicit in local practices rather than being formally expressed (p. 421).

While we agree that capturing local knowledge is important, our findings reveal that equally important is how interpretations of knowledge involving the exercise of power emerge

in discourse. In our case the enthusiastic principal of our story did not question the hegemonic discourse and the power of the mainstream that he represented. He did not appreciate the depth of the colonial legacy suffered by the subalterns: their low literacy levels, economic depression, and disjointed social structure. Similarly, the aborigines were also blind, seemingly unable to resist the dominant discourse of those who were trying to help them. Hence our research reveals that the context (postcolonial) is not something that is outside the box, so to speak, as is common in many IS theories, but deeply embedded in the values and assumptions of both the mainstream and the aboriginals.

Consequently, our aim is not to point the finger at either Principal L or the aboriginal villagers. Rather, our aim is to draw attention to the postcolonial context within which these projects take place. While this ICT4D project might be interpreted as badly conceived, with an over-ambitious principal, poor user involvement, and dishonest journalists, these faults are but symptoms of this context. Given that many ICT4D projects take place in postcolonial contexts in the developing world, we believe that our approach and our findings may be relevant to other ICT4D projects. We suggest that this postcolonial context needs to be better understood and addressed if ICT4D projects are to have a greater chance of success. Well-meaning attempts that focus solely on ICT to achieve socioeconomic progress for disadvantaged groups are unlikely to be successful unless there is a corresponding focus on addressing some of these more deep-seated issues.

Fifth, we suggest that a much longer time horizon is needed to ensure the success of ICT4D projects. Many ICT4D projects are too short-term oriented and too narrowly focused, which means they may not address these more deep-seated problems. Our claim is that, until those involved in ICT4D projects address these contextual issues and are willing to commit to a much longer time horizon, the benefits of ICT4D projects will be minimal if not counterproductive. However, we acknowledge the difficulties that expanding the time horizon might pose for funding agencies. The key point is that the invisible power of the mainstream discourse needs to be recognized, and more credence given to the discourse of the subalterns.

Finally, we suggest that the subalterns have to reinvent themselves as active participants rather than be ambivalent/dependent recipients in any ICT4D project. If the subalterns simply acquiesce and assimilate into the mainstream, the danger is that they might become even more dependent on the mainstream for knowledge and resources (Gibson 2003; Said 2001; wa Thiong'o 1993).

In conclusion, our hope is that lessons can be learned such that future ICT4D projects may better realize the potential

benefits of ICT for helping underserved groups. Future research could consider how communities such as the one studied here can benefit from ICT. For example, one interesting avenue might be to consider the renaissance of indigenous cultures in many parts of the world and see whether ICT4D can play a part in such initiatives.

Acknowledgments

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