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Exploring the Tension Between Modernization and the Deployment of Information and Communication Technologies in Developing Countries:
A Case Study of the XO Laptop

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Exploring the Tension between Modernization and the Deployment of Information and Communication Technologies in Developing Countries:

A Case Study of the XO Laptop

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Abstract

Using the XO laptop as a case study, this project explores the tension, if any, between modernization and the diffusion of information and communication technologies in developing countries. Modernization, the diffusion of innovation, and Burniske's (2003) chain of doing serve as theoretical frameworks to examine new visions of development that One Laptop Per Child (OLPC) aims to introduce to impoverished people on a global scale, with poverty alleviation being their main goal. Employing a qualitative approach, namely document analysis and analysis of online discussions, this research concludes that modernization is still used in new visions of development.

Table of Contents

List of Abbreviations

CGE	Campagne Générale de l'Éducation
CMC	Communication-Mediated Communication
G1G1	Give One Get One
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
IRI	Interactive Radio Instruction
LDC	Less Developed Countries
MIT	Massachusetts Institute of Technology
MDG	Millennium Development Goals
OLPC	One Laptop Per Child
STC	Save the Children

Chapter 1: Introduction

Citizens of developing countries are currently suffering from poverty, affecting their society economically, socially, and politically (Hendelman, 2003). For example, in Sub-Saharan Africa, at least half the working population earns less than $1 a day, making it difficult for them to sustain themselves and fight problems like malnutrition, especially with the ever-growing food prices in developing countries (Millennium Development Goals [MDG] Report, 2008). The MDG Report (2008) further demonstrates that children are directly affected by conflict and political unrest, lacking structure to lead normal lives. In fact, the same report states that 1 out of 5 refugee children in the developing world cannot take part in the education system for lack of infrastructure. Marc Kielburger (personal communication, April 16, 2009) – co-founder of Free the Children, a nonprofit organization in which children help children through education – stated at the 2009 Millennium Summit in Montreal that 113 million children worldwide between the ages of 3 and 5 are still out of school and more than 300 million children living in territories afflicted by armed conflict are child soldiers (see also UNICEF, 2009).

In the past, various theories, such as modernization (Bernstein, 1971; Melkote, 2003; Singh, 2003) and dependency theories (Ball-Rokeach & Defleur, 1976; Gunder Frank, 1967; Singh, 2003) have been advanced in order to explain and justify economic, social, and political changes. Over the years, many organizations have tried to help developing countries economically and socially. Among these organizations, the United Nations has launched the Millennium Development Goals (MDGs) in 2000 to improve human conditions in developing countries by the year 2015. These goals are aimed to alleviate poverty by approaching it from its different facets, such as educational and economic, through setting various targets. Two of these MDGs will be of relevance within the thesis: "achieve universal primary education" (MDG Report,

2008, p. 12) and "develop a global partnership for development" (2008, p. 44). In conjunction with the other goals, these two are believed to lead to great social, political, and economic change within many societies.

Nelson Mandela believed that education should be viewed as the most effective tool to affect global change (Campagne Générale pour l'Éducation [CGE], 1999). While UNESCO (n.d.) and Bernstein (1971) have helped conclude that education is a key element to develop better living standards, many believe that information and communication technologies (ICTs) can help achieve that educational goal (CGE, 1999; Mansell & Wehn, 1998; Newhouse, 2002; Singh, 2003; Trucano, 2005; UNESCO, n.d.). Similarly, Mansell and Wehn (1998) considered that, "these technologies are regarded as tools which may provide a new potential for combining the information embedded in ICT systems with the creative potential and knowledge embedded in people" (p. 12). The question thus arises: in what way can ICTs be used to improve education in order to improve living standards in developing countries?

Action versus Roadblocks

As the MDG Report (2008) suggested, many countries, such as Chile, Singapore, Costa Rica and South Africa, installed new technologies within their countries in order to insure their industrial development. For example, the World Links (South Africa) and Enlaces (Chile) programs look to improve the transfer of knowledge through the installation of computers within community centers, leading to economic opportunities and better educational outcomes. However, some advantages and disadvantages often come into play when introducing new technologies in countries that have not been exposed to such tools. Some of these advantages include the promotion of literacy and the facilitation of knowledge transfer (Adeya, 2002). On the other hand, gender and social inequalities may occur in the distribution for use of these

technologies, increasing the digital divide (Grace & Kenny, 2003). Also, language barriers can arise as information on the Internet and in the media is more often than not communicated in French, English, and Chinese (Adeya, 2002; Grace & Kenny, 2003). Consequently, the question arises if ICTs are rightfully being used to help reduce poverty and if they are necessary for the enhancement of education, raising questions of modernization in the diffusion of technologies.

Many ICT projects, such as the two previously mentioned programs (World Links and Enlaces), aiming to improve education and facilitate knowledge transfer with the goal to alleviate poverty, have been successful in their installation and use. However, we cannot yet conclude whether or not poverty alleviation results from these projects as this process takes time. The combination of the participatory approach, which promotes the transfer of information between the members of a society (Jacobson, 2004), the empowerment theory, which explains how mastering information can build autonomy (Perkins & Zimmerman, 1995; Prévost, 2004), and the constructionist theory, which is about learning through tactile experiences (Papert, 1993) creates a basis for new projects, such as the XO laptop. One Laptop Per Child (OLPC) – a nonprofit organization developed by Nicolas Negroponte out of the Massachusetts Institute of Technology (MIT) Media Lab – has developed the XO laptop as a tool to end global poverty through education. Envisioned as an *open source* project (meaning software can be manipulated at will resulting in the reconstruction of knowledge), OLPC aims to distribute computers among impoverished children around the world in order to gain a different learning experience, thus inspiring them to stay in school and continue to higher education (OLPC, 2009, Mission section, para. 3). Their education could empower them, leading to better jobs and the development of autonomy. Accordingly, an important question arises: via its educational efforts, how is the XO

laptop implemented into societies that cannot always meet their basic needs and how does it affect the transformation of societies within developing countries?

Against such a backdrop, employing a qualitative research method and using the XO laptop as a case study, this research explores the tension, if any, between modernization and the diffusion of a new form of educational ICT in order to understand whether modernization is still used in new visions of development for the alleviation of poverty in developing countries. In doing so, this study aims to provide a clearer understanding of new visions of development and discern whether these ideas can be reproduced sustainably.

Thesis Outline

Essentially, the research starts with an overview of the general theories and debates about new technologies in developing countries, followed by a detailed methodology in which I explain the various forms of data-collection tools used for the purpose of the research, followed by the results and analysis, a discussion of the results and the conclusion of my research.

The literature review presents an overview of the theories pertaining to development, education, as well as theories about the diffusion of new technologies. The combination of all three examinations thus exposes arguments about new technologies in developing countries and establishes the basis of the research. The literature review begins by introducing the theory of human need and well-being (Gough, 2004; McGregor, 2004). This theory acts as the basis for development, which leads to other theories relating to development, namely modernization (Bernstein, 1971; Melkote, 2003; Singh, 2003), dependency (Ball-Rokeach & Defleur, 1976; Gunder Frank, 1967; Singh, 2003) and the diffusion of innovation (Rogers, 2003). Through the literature review, these theories have been applied to education in particular, as it is the main mission of OLPC. By way of these ideas, globalization (Habwe, 2009; Scholte, 2000) and issues

of the digital divide (Basu & Weil, 1998; Chen & Wellman, 2004) question the motives of OLPC and the role of ICTs in education. By questioning the XO laptop within the framework of these various theories, the three main research questions are posed to help guide the study.

To help answer the research questions, a specific methodology is justified. An analysis of computer-mediated communication (CMC) served as the main source to question OLPC's initial strategies through the inductive analysis (meaning the themes are revealed during the analysis of the documents and online discussions, Lindlof & Taylor, 2002) of deployment documents and online discussions through the use of mailing lists. The documents include the Educational Activity Guidelines (2008), the Deployment Guide (2009) and Nigeria and India's specific deployments. These documents are available to the public on the organization's website and have been written by OLPC members themselves, thus analyzing documents from the organization's perspective. Then, the entries of India and Nigeria's respective mailing list were analyzed against the deployment documents. These online discussions involved members of OLPC as well as volunteers voicing their opinion and suggestions about the XO laptop. Thus, the perspective of the people is also taken into consideration in order to get a concise vision of OLPC's initial strategies in the face of modernization through the diffusion of innovation. The chapter ends with the ethical considerations and issues of trustworthiness regarding the methodology.

The following chapters present the results of the applied methodology and the analysis of these results. First, the results and analysis of deployment documents are presented, followed by the results and analysis of online discussions through mailing lists. Both of these analyses are then assessed against each other by comparing and contrasting the emerging themes that mainly reveal the initial strategies of OLPC.

The final chapter of the thesis presents a summary of the results and reminds the reader why this research is important. Moreover, it discusses the practical implications of the results and reflects on the limits and direction for future research.

Chapter 2: Literature Review

Various authors, researchers, and organizations (Adeya, 2002; Albirini, 2006; Halse & Terzoli, 2002; Grace & Kenny, 2003; UNESCO, n.d.) explored the issues regarding the implementation of new technologies in developing countries in the past, such as modernization and inequity. From this exploration, the view of ICT use changed over the course of history. The transition from the dominant paradigm of modernization during the '60s to an alternative paradigm of empowerment and participation (Melkote, 2003; see Appendix A for a detailed description of both frameworks) drives the vision in which OLPC aims to implement its laptop around the world. This literature review explores the different approaches taken when introducing ICTs in developing countries, what this process hopes to achieve and what its challenges are. Framed under the modernization theory, the diffusion of innovation theory, and Burniske's (2003) chain of doing, as well as through understanding postmodernist thought, the literature review will touch on four main aspects: literacy, education and skill; choice, democracy and participation; modernization; and ICTs for development (ICT4D). Analyzing these concepts is key for identifying how OLPC implements its laptop in developing countries because they form the basis of new visions of development. Similarly, assessing the benefits and challenges of these concepts provides information on the effect that the XO laptop could have in the transformation of societies in developing countries.

First, it becomes imperative to understand the goal of development, which can be rooted in the theory of human need and well-being, to identify how new technologies impact developing countries.

Theory of Human Need and Well-Being

The main focus of development is to provide developing countries with more comfortable lives, meaning it wants to enhance people's well-being. Essentially, well-being is compromised when basic needs are not met (McGregor, 2004). McGregor's (2004) theory of human need suggested tending to health and autonomy – the basic dimensions of human needs – to meet those needs (see Figure B1). The author claims that autonomy is restricted when one's physical health is poor. In fact, well-being goes beyond material dimensions for it looks at poverty from a person-centered perspective, shifting the vision away from the deficits of poverty toward a vision where people can take control of their lives (2004).

Although autonomy and health are universal human needs, culture restrains the satisfaction of those needs within a universal model. As such, McGregor (2004) believed that universal human needs ought to be broken down into intermediate needs and satisfied according to culture. In fact, Gough (2004) explained that if basic human needs are universal but need-satisfiers are place and time-specific, then influencing both at the same time is impossible. He believed that doing so was modernist, imperialist or Western, as the needs cannot accommodate the one-size-fits-all practice of today's world. Besides, Melkote (2003) suggested that although many agreed that development meant improving human living conditions, there was still much debate as to what constitutes improved living conditions and how the process should be carried out. As such, the theory of human need recognizes cultural differences within a Universalist framework (Gough, 2004).

Gough (2004) suggested that approaches such as the MDGs have universal frameworks and wondered if these kinds of approaches imply that the West knows best. Thus, the following

question guides the literature review: how does the XO laptop fit within the framework of human need and well-being for poverty alleviation?

Literacy, Education and Skill

Basic education is recognized as an intermediate need (Gough, 2004; McGregor, 2004; Topper, 2008). As education improves cognitive and analytical skills (Riemer, 2008; Save The Children [STC], 2009), it can be assumed that it primarily serves the basic need of autonomy as it helps develop critical autonomy.

Most importantly, education is believed to be a key tool for poverty alleviation and subsequently for better health care and sanitation (MDG Report, 2008; UNESCO, n.d.). Yet, there are still 776 million adults worldwide – most of them women - with very limited or no literacy skills (STC, 2009). While, the highest illiteracy rates can be seen in Southern South Africa and South and West Asia (MDG Report, 2008), the problem is not limited to developing countries. Many developed countries encounter illiteracy problems such as the Netherlands, France and the United States (STC, 2009). Having said that, many countries have made progress in terms of eliminating poverty (by offering education to children) and improving health outcomes (Galanek, 2008). In fact, much of this progress can be attributed to the targets set at the World Education Forum in Senegal in 2002 in order to reach the MDG of reaching universal primary education by the year 2015 (Motakef, 2007). Signed by 164 countries, these targets include, but are not limited to, "achieving a 50 percent improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults" and "improving all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in numeracy and essential life skills" (2007, p. 153). Therefore, can it be assumed that a Western initiative

was needed to improve well-being in developing countries? Does this imply that the West knows best as Gough (2004) suggested?

On the other hand, although there has been progress in achieving these targets, some countries still struggle to meet them. In fact, despite the increase in school enrolment in South Africa, less and less students are passing their matriculation (grade 12) exams; thus less and less students are graduating from primary education (Dlodlo & Beyers, 2009), hindering the satisfaction of basic needs. As knowledge and learning are now widely regarded as the key to sustainable development and growth of economies and societies (Baskaran & Muchie, 2006; Boily, 2004), should Western initiatives, such as the MDGs, be redefined to accommodate local culture rather than using universal models?

What is Literacy?

It is believed that literacy is at the heart of education and is necessary to eradicate poverty and improve health (UNESCO, n.d.). It is viewed as the key to knowledge and as the tool that permits a child to be successful during his/[her] primary and secondary education (n.d.).

However, literacy is not simply about being able to read, it is also about finding meaning in what is read and to understand that meaning (Bawden, 2001), developing the critical element of autonomy. A functionally literate person can take part in community activities through that understanding, resulting in its development; a functionally illiterate person would be one whose knowledge is lower than the norm (Motakef, 2007). Although the general depiction of literacy is being able to read and write, there is more to it than this simple description for there are different kinds of literacy, namely media literacy, computer literacy, information literacy, digital literacy (Bawden, 2001), and heath literacy (Kickbusch, 2001; Levy & Royne, 2009). Among these, information literacy – the ability to access and evaluate information from various sources – is

considered to be the most important skill to have for the 21st century (Bawden, 2001). In fact, the U.S. Association of Supervision and Curriculum Development stated that, "[i]nformation literacy, the ability to locate, process and use information effectively, equips individuals to take advantage of the opportunities inherent in the global information society. Information literacy should be part of every student's educational experience" (2001, p. 232). However, this statement implies that it is necessary to take part in the global information society. Is such participation something that developing countries should strive for?

Education in Developing Countries

First, a clear understanding of the historical context of literacy in most developing countries is needed in order to understand the current situation of education. In fact, Riemer's (2008) observations, surveys and interviews in Botswana helped her discover that a country's education system cannot be explained without its colonized history, as is the case for many developing countries such as Botswana. For example, because of colonialism, the learner's view in Namibia meant that a good education system gave power (Riemer, 2008). During apartheid, little to no education was provided to the colored people, therefore an education that is not based on colonial standards is not valued nor considered empowering today (Papen, 2005). The influence that colonization has had on the education system of many countries, especially in Africa, has more often than not shaped the direction of their development toward a Western ideal. In this sense, McGregor (2004) argued that satisfying needs in a universal framework was part of a Western discourse.

The Potential of Education in Developing Countries

Empowerment and Freedom. Morake, the 1979 Minister of Education of Botswana, believed that literacy was linked to personal freedom and national progress (Riemer, 2008). Moreover,

Save The Children's (2009) *State of the World's Mothers* report stated that early learning programs are beneficial for the first years of school, adulthood, and society as a whole. However, learners often do not understand the assumed positive impact their education could have on society. In Namibia for example, what mattered to learners was not what they could achieve in the future, but how it made them feel at the time. They felt better about themselves and felt more respected by their peers (Papen, 2005). We can thus question the importance of personal empowerment upon conscious change within a society.

Empowerment comes in many forms: "In Christianized southern Africa, literacy provides a recognizable path [and]... is a way of being human" (Riemer, 2008, p. 459). This newly acquired literacy provided the people of Botswana with an increased sense of personal power, even though it served personal reasons rather than conscious social action (2008). However, can it be argued that personal empowerment leads to unconscious social change?

Health care. In a qualitative study on a population's wants versus their needs in Ethiopia, it was demonstrated that in some regions, although daily food and communication were considered important, health was considered the main priority (Lavers, 2008). When children are cared for from their early years, they have a better chance to grow healthy, do better in school and reach their full potential as adults, creating a powerful national investment contributing to economic prosperity (STC, 2009). The main priority of health care is often attributed to mothers, as the main caretakers of children (2009). As such, mothers need to be given proper health education.

However, not only do mothers need such an education, but also proper training should be given to health workers. In fact, unskilled health workers have contributed to high maternal mortality rates (MDG Report, 2008). As such, the Loci Hospital in Northern Uganda has been training doctors to provide adequate health personnel. Although non-locals first ran the hospital,

trained Ugandan nurses and doctors are now keeping the hospital sustainable (personal communication, Corti, April 16, 2009).

Today, health care has become consumer centric where the consumer has a choice of medication to take. If the patient is health illiterate, the best-informed choice will not be made, which can lead to higher mortality rates and health costs (Levy & Royne, 2009).

Economic prosperity. In 1999, the Committee on Economic, Social and Cultural Rights of Germany stated that education was an empowerment right and that it served as the main vehicle to lift people out of poverty and fully participate in their communities (Motakef, 2007). In fact, higher rates of literacy positively affected employment in rural non-agricultural activities in many districts of Punjab, India (Kaur & Nanda, 2009). Daniel, Kanwar, and Uvalic-Trumbic (2009) believed that reaching higher levels of education would surely contribute to national prosperity, contributing to political and economic stability.

Mostly, there is an ongoing assumption that registering girls in schools will surely lead to economic prosperity and that investing in girls is smarter than investing in women (Warhurst, 2009). As of now, many societies view it as little value to send girls to school as they are only temporary members until they marry, especially when the economic sources are limited (Lucy, Ghosh, & Kujawa, 2008). However, it is believed that if Kenya's 1.6 million girls who drop out of school finished their secondary education, they could bring great economic prosperity to the country (Warhurst, 2009). An extra year in primary school can apparently boost a girl's wage by 10% to 20%, up to 25% with every extra year of secondary school (2009). Not only do their wages increase, but it is also 90% more probable for young women to reinvest their income into their families, whereas only 30% to 40% of men would do the same (Alter, 2008; Warhurst, 2009). Warhurst (2009) believed that educated girls had the opportunity to get loans, start

businesses and reinvest in their families, giving their children the chance to have an education as well. Having said that, Chapman, Emert and Coyne (2003) concluded in their evaluation of education for girls in Africa that the lack of commitment and leadership from responsible governments put some educational initiatives to a halt. Alter (2008) claimed that both families and governments needed to understand the importance of sending girls to school.

The importance of education. A recent article on AllAfrica.com clearly illustrated the importance of education. *Rwanda: Modern farming to reduce rural poverty* by Rwembeho (2009) explained that modern farming could help in the production of crops by using exotic cows (cows from other countries) rather than traditional ones because of the different nutrients they provide. However, loss of cows to disease and death stems from farmers' lack of skills to tend their cattle, challenging the government to provide elementary skills.

However, Lavers (2008) warned that formal education should not be viewed as a universal goal because other forms of knowledge, such as religion, sometimes take precedence over formal education according to the cultural and societal context. This was the case in two cities of Ethiopia (Kedada and Dessu) where one cherished formal education and the other valued other forms of education (Lavers, 2008). Having said that, it becomes imperative for educational projects to consider the needs of the society.

The Current State of Education

Some believe that primary schooling is the most important element of education (MDG Report, 2008; Motakef, 2007; STC, 2009). In fact, about 75 million children around the world do not complete primary school for various reasons such as dropouts and low school enrollment (STC, 2009). Save The Children's report (2009) stated that these children usually come from very poor families and communities. Sub-Saharan Africa hosts almost half of these children and

24% live in South and West Asia. Most of them are girls, although girls are more likely to do better in school (STC, 2009; Warhurst, 2009).

The MDG Report (2008) offered more reasons as to why children did not attend school. In fact, it reported that, "drought, food shortages, armed conflict, poverty, lack of birth registration, child labor, and HIV and AIDS contributed to low school enrolment and high dropout rates for both boys and girls" (p. 17). Yet, this phenomenon is not only limited to Western and Central Africa, but can also be observed in developed countries like Canada where First Nations people have less than a high school diploma due to some of these factors (McKeough et al., 2008).

Developmental problems resulting from unmet needs also contribute to low school attendance in developing countries (STC, 2009). Nearly 40% of children under the age of 5 in developing countries – equivalent to more than 20 million children worldwide - fail to reach their full cognitive potential because of poverty, poor health, insufficient nutrition, and deficient care (2009). A good educational infrastructure would help people living under those conditions reach their full potential.

Teacher training and shortage. Teacher training and shortage are major issues when it comes to education in developing countries (Ludlow, Keramidas & Kossar, 2008; Motakef, 2007; Hawkins, 2002; Huyer, 2003; Wagner et al., 2005), despite the work of organizations like World Links (Huyer, 2003) whose primary objectives include providing teacher training, particularly to women. Most important, a teacher's approach to education has an influence on the student's interest in the subject. Students will not feel compelled to study a subject if there are no qualified teachers to spark interest (Dlodlo & Beyers, 2009). Teacher training could provide a solution to this problem.

Inequality. Basic and cross-cultural education is not available to everyone. Actually, over 44% of less developed countries (LDCs) and over 20% of the world population is illiterate (Brown, Tower & Taplin, 2005). With such high numbers, it can be difficult to close the gap between literate and illiterate. In 1948, the declaration of human rights stated that education for all implied non-discrimination, yet generally, illiteracy is a female problem (Motakef, 2007). In fact, UNESCO stated that approximately two-thirds of illiterate people in the world were women (2007). Lavers (2008) added that the perception of women as housewives and mothers was internalized in many societies, failing to recognize their own potential. Consequently, women are overlooked for socio-economic opportunities (MDG Report, 2008).

As previously mentioned, girls' attendance in school is considered to have a major impact on society as a whole. In fact, STC (2009) claimed that when girls attended school over a long period of time, they were more likely to be healthier, economically empowered, knowledgeable on the education and health of their own children, would marry later, had fewer and healthier pregnancies, and had safer deliveries. Against such a backdrop, many educated women are still finding it difficult to get valued jobs and higher-level positions (MDG Report, 2008).

Having said that, discrimination regarding school attendance does not only affect women. Children in the developing world whose parents were affected by HIV/AIDS can face discrimination because it often stops them from being accepted into a school (STC, 2009).

Effects on health. With health being one of the dimensions of basic needs (McGregor, 2004), a lack of basic education among young mothers has a major impact on children mortality rates in rural and poor areas (MDG Report, 2008). In fact, 33 million people worldwide are affected by HIV/AIDS and 90% of them live in sub-Saharan Africa (STC, 2009). Of those, 2 million children under the age of 15 are affected by HIV/AIDS (2009). It can only be clear that children

affected by the disease live shorter lives, making basic education for mothers an important issue to be tackled if affected countries want to see an economic growth; seeing that their best capital is dying at an alarming rate (2009). Educated mothers are also more likely to positively tend to their children (2009). Having said that, most women in sub-Saharan Africa do not have access to family planning and the use of contraceptives is not as high as the desire to limit childbirths. As such, the persistent high fertility rate threatens the reduction of child mortality, hunger, malnutrition, and the increase of primary education enrolment (MDG Report, 2008).

Policy. Policy makers have made great progress in increasing primary education enrolment. Indeed, political will and investments have helped reach primary education enrolment to 90% in 2006 (MDG Report, 2008). Chapman et al.'s (2003) Diphalana project has helped change policies regarding school enrollment for girls in Botswana. Major efforts from both Chapman and his colleagues and the government in place have lifted the policy against young pregnant mothers resulting in more girls having the chance to attend school. Girls and women have great potential to revive the various economic situations in developing countries. In order to do so, it was claimed that innovative policies had to be put in place to ensure human rights were met in regards to those girls (Warhurst, 2009).

Financing. Security in childhood being an intermediate need (McGregor, 2004), people who feel insecure are less likely to ask for equality (Scholte, 2000); therefore basic needs are not being met. Economic insecurity refrains many from having an education because of its high cost (Ludlow et al., 2008; MDG Report, 2008), even though some projects such as e-education and satellite schools have been put forward as low-cost solutions (Grace & Kenny, 2003).

Likewise, some institutions cannot afford to offer literacy courses, thus establishing the need for secure funding to provide basic courses (Ludlow et al., 2008; Motakef, 2007). While donors

understand the importance of funding education (Galanek, 2008), the biggest obstacle to primary and secondary education in developing countries remains the high fees charged to parents for each child in school (Alter, 2008; Ludlow et al., 2008). The solution to integrate eLearning provided by Daniel and his colleagues (2009) is assumed to make access easier because of its low cost. However, access to eLearning still remains a major challenge.

Human capital investments and literacy rates have increased in some parts of the world, as it did in China through its Rural Bookroom project, which aimed to reduce expenses of books for peasants and guided them to improve income (Liu & Li, 2008). Despite increasing literacy rates, countries like Botswana still struggle with almost half the country living under a dollar a day (Riemer, 2008). We are then to wonder what the solution is for economic prosperity.

It can be grasped from the literature on literacy, education and skill that there is no universal blueprint for education in developing countries - often conceived by Western authorities - and that education must be adapted to the local context. In this sense, one can wonder how the XO laptop serves as an effective educational tool for the alleviation of poverty. There is hope that the right to literacy will be tackled less lightly as part of the right to education (Motakef, 2007). Lavers (2008) summed it up well:

> The ideal role of development must be to create spaces in which people are supported and have access to knowledge. In this way, they may be able to become critically autonomous ... and sufficiently empowered to challenge existing norms and power structures, so that they are free to make informed decisions, and to decide on the goals that they have reason to value, even to critique or reject 'development' itself. (p. 145)

Choice, Democracy and Participation

Modernization and dependency theories (further explained in the *Modernization* subsection) positioned under-development in the relationship between power and poverty (FRIDE, 2006). When it comes to power, empowerment lies within the hands of individuals, as opposed to those of developers or organizations as modernization would suggest (Melkote, 2003). In fact, a World Bank study illustrated that poor people mostly felt the reality of *voicelessness* and powerlessness when asked about ways to tackle poverty (Lucy et al., 2008; see also Gough, 2004). Indeed, development sees power as a key element to social change and the idea behind empowerment is to confront the imbalances of power (FRIDE, 2006).

Based on McGregor's (2004) theory of human needs, giving power to the people aims to create local solutions rather than fitting problems within a dominant discourse constituting of modernization and the diffusion of innovation (Melkote, 2003).

What is Empowerment?

The term *empowerment* has many definitions depending on its socio-cultural context (FRIDE, 2006). However, the FRIDE's (2006) backgrounder on empowerment insisted that one general definition had to be elaborated in order to avoid the creation of unusable policies when dealing with development. As such, empowerment is most commonly defined as the capacity to make decisions and take control of a situation (Lucy et al., 2008). Various factors influence empowerment: access to income-generating activities, access to health care, education, land ownership, political participation, freedom of choice and movement, etc. (2008). Most of these factors fit within McGregor's (2004) framework and pose the basis for human needs. It can thus be assumed that McGregor argued for empowerment.

The concept emerged from the need to humanize development but its meaning was lost along the way because of global capital expansion. This neglect highlights the importance for each individual to define empowerment according to their context, placing the individual at the heart of development policies and programs (FRIDE, 2006).

The Participatory Approach

Seeing that mainstream development has proven to be unsuccessful because of its focus on economic development (Makuwira, 2006), an alternative development theory was advanced to redefine goals of development and introduce alternative practices (Makuwira, 2006; Melkote, 2003). In fact, it is considered important that any attempt to satisfy the needs must combine the knowledge of experts and the knowledge of those whose basic needs need to be met (Bezanson & Sagasti, 1995; Fouracre, Sohail & Cavill, 2006; Gough, 2004; Singh, 2003). As such, the generated knowledge is specific, local, and non-Western, resulting in the empowerment of local knowledge (Melkote, 2003), which is currently a challenging process for Western consultants working in developing countries (Banerjee, 2009). Various groups have been able to adapt such an approach. For example, Pierre Miranda's anthropological work regarding the people of Oceania has empowered local knowledge through a virtual exhibition that gathered various information using pictures, videos, and hyperlinks to represent the culture and tell the world about it (Miranda, 2001). Vietnam had already started this practice in the '90s where the participatory approach was used to induce social change by promoting participatory communication in order to encourage ownership, local decision making, and the development of locally adapted solutions (Van de Fliert & Do Thi Minh, 2009).

This participatory approach has been used as the common method to tackle empowerment in new discourses of development (Boily, 2004; Prévost, 2004). Such an approach – based on the

transfer of knowledge *within* a society - is deemed important for the improvement of living conditions and for social change (Bezanson & Sagasti, 1995; Davidson, Vogel, Harris & Jones, 2000; Jacobson, 2004; Prévost, 2004), although the state of good living conditions is highly debated (Melkote, 2003), as previously stated.

Freire (1970) believed that:

> [T]rue participation should encourage social and political action by the people at all levels. The goal of participation efforts should be to facilitate conscientization of marginalized people globally of unequal social, political, and spatial structures in their societies. It is through conscientization and collective action that they perceive their needs, identify constraints to addressing these needs, and plan to overcome problems (as discussed in Melkote, 2003, p. 138; see also FRIDE, 2006).

OLPC focuses on such a process through Wi-Fi (describing wireless network technology) or a *mesh* network (meaning computers can connect to each other with no support from an Internet Service Provider) making the transfer of knowledge faster and more adequate (OLPC, 2009, Mesh Network Details section). The project promotes participation by encouraging knowledge construction via online or offline group projects.

In their study about whether a participatory approach influences interest and motivation toward the study of science, engineering, and technology, Dlodlo and Beyers (2009) concluded that this way of learning left an open and less stressful space to students and yielded positive results in skill acquirement and self-satisfaction.

Democracy. As an element of modernization and a form of participatory action, democracy is believed to have positive effects on societies (Makuwira, 2006). In developing countries, it is assumed that a democratic society would provide more freedom to people and thus more

possibilities for development (2006). However, democracy in developing countries has not always proven to be sustainable (Makuwira, 2006; Spears, 2002). The freedom that democracy is believed to bring forth seldom rests in the hands of the population and is more often than not consolidated in the hands of the few elites with political or religious power (Makuwira, 2006). In fact, Gough (2004) explained that participatory action, "can hide diversity and present a falsely homogenous view of the 'community' it is studying" (p. 294), as it usually favors the powerful and well connected rather than the poor (see also Van de Fliert & Do Thi Minh, 2009). Makuwira (2006) asserted that education played an important role in freedom-based development as it cleared up new terms and offered theories that support freedom-based development (such as peace-building theories).

Inequality. Although the participatory approach aims to close inequality gaps, many still cannot experience the opportunities of this method. For example, Gatua (2007) stated that Africa's contact with dominating European countries during the colonial period has set the atmosphere for the universal oppression of women.

Nonetheless, while many women still face discrimination in the face of various services such as health and education (in Bangladesh for example) – hindering their development (Dlodlo & Beyers, 2009) - some NGOs have helped women living in dominance-dependence relationships increase their sense of self-empowerment by having control over their own wallets (Lucy et al., 2008).

Education and Empowerment

Education is thought to provide the knowledge to develop one's own potential, leading to empowerment (Papen, 2005; Riemer, 2008). In its 2001 Human Development Report, the UNDP outlined that primary education developed basic capabilities for human development, thus

establishing a base for innovation and production, leading to empowerment. These newly acquired capacities are believed to lead to the establishment of freedom and the fulfilment of human rights that are not always satisfied (Prévost, 2004; Riemer, 2008). As such, McGregor's (2004) theory of human need encompasses education for empowerment, and consequently the alleviation of poverty. However, the following question arises: How can education be implemented in order to reach self-empowerment and promote local knowledge without folding to the dominant discourse and unsustainable practices?

The literature on choice, democracy, and participation raises the important point that implementation of education for empowerment must be viewed from self-interested individuals as opposed to an outsider's point of view.

Modernization

Modernization Theory

Although there can be positive effects to modernization – mainly economic prosperity - there are opposing arguments regarding the social change generated by this concept. Bernstein (1971), Ellul (1964), Hendelman (2003), Jacobson (2004), Melkote (2003) and Tiejun (2007) all stated that modernization was the diffusion of Western ideas for capital expansion within developing countries, guiding these countries towards a global vision. As a result of colonization (Gunder Frank, 1967; Tiejun, 2007), modernization often involves the transformation of traditional cultures into modern cultures that share Western ideas (Bernstein, 1971; Ball-Rokeach & Defleur, 1976; Ludlow et al., 2008), where industrialization, ICTs, and literacy become commonalities (Bernstein, 1971; Melkote, 2003) alongside the advocacy of individuality and individual interest (Tiejun, 2007). Indeed, Inglehart (2000) believed that human survival highly depended on industrialization and economic growth. As such, modernization has been used to

promote industrialization. However, it was proven to have some negative effects on a society. In fact, the expansion of urban modern areas into rural areas sometimes rendered many people unemployed (Ludlow et al., 2008). Melkote (2003) identified this "development of underdevelopment" to the economic development of Western Europe and North America.

Nonetheless, as the increase of literacy rates is considered to be a key element to modernization (Hendelman, 2003; Singh, 2003), students in Botswana viewed literacy to be a necessary element to fully participate in today's modern society (Riemer, 2008). Therefore, with its educational intention, OLPC can be seen to modernize developing countries. As the introduction of new technologies was the catalyst to industrialization in the past (Volti, 2006), will the XO laptop do the same to accelerate development?

Moreover, although some believe that positive political and social outcomes can result from this acceleration (Adeya, 2002; Baskaran & Muchie, 2006; MDG Report, 2008), the destruction and appropriation of traditional cultures caused by modernization can be perceived as a new form of colonialism (Bernstein 1971; Ellul, 1964; Jacobson, 2004; Melkote, 2003; Sidel, 1993, see also Hutson, 2008) something often referred to as *cultural imperialism* and occasionally seen as a form of oppression (Gatua, 2007; Jan, 2009).

The cultural imperialism theory argues that the global economic system serves the agenda of wealthier nations, with LDCs having little control over their economic and political affairs (Jan, 2009). In this sense, those subject to cultural imperialism could have their intermediate needs neglected for the purpose of an economic agenda. Cultural imperialism thus implies that the West knows best about the economic and political affairs of LDCs, applying a Universalist approach to local matters (Gough, 2004).

Importation of Western Trends

Lavers (2008) highlighted the works of Escobar and McGregor who argued that, "universal models tend to be European or North American constructs serving those interests at the expense of those of developing countries" (p. 143), a vision stemming from Gunder Frank's (1967) dependency theory. In fact, Riemer (2008) pointed that through Christian missions, the people of Botswana have not only been inspired to read and write but have also been shaped to transform and improve their society through *White eyes*. This vision echoes Gough's (2004) fear of universal initiatives taking Western traits.

In reference to media in particular, Song and Zhang (2008) discussed cultivation theory, which states that one cannot escape the influence of the cultural environment created by the media, an element deemed important for modernization. Although their results cannot be generalized, their study on the influence of American media on Chinese traditional values showed that even though China's mainstream animation production still endorsed traditional values, some nontraditional values infiltrated and replaced some of those values, such as hierarchy for equality (representing a less authoritarian and a more democratic society).

Another example of the change in culture is the qualitative study of Marino, White, Schweitzer, Chambers and Wisniewski (2009) on the relationship between two Arctic villages dealing with the introduction of Western technologies to provide clean water. The study concluded that as Western goods replaced natural sources to collect water from rivers (such as fuel cans, plastic buckets, bathing tubs and water tanks), the sanitary and sustainable measures that were taken by the semi-nomadic people rapidly changed because of pollution that contaminated the water due to the introduction of said Western innovations. On the other hand, as both communities installed water tanks in their villages, they were both using it in completely

different ways, with one village being very proud of the modern system and its convenience, while the other believed it to be unhealthy and too much of a hassle to repair.

Moreover, Hutson (2008) highlighted the effects that modernization has had on South Africa. She stated that before colonial times, women had a high social status because they had an important role in society. With the venue of Western ideals, the idea of women changed and has led them to be seen as child-bearers only, reducing their social status (Hutson, 2008). Since apartheid however, many women have come together to fight this injustice and regain social equality (2008).

Against such a backdrop, it can be contested that there is no blueprint to development (see also Albirini, 2006; UNDP, 2001). Change in a culture's worldview affects critical autonomy and basic needs are now being met according to new environments created by the dominant discourse's standards. These negative outcomes depict a claim against modernization and leave to question whether the XO laptop adheres to the dominant discourse.

Modernizing Education

While it was previously suggested that an absolute blueprint of development and advancement was impossible to achieve, Papen's (2005) study on the social practices of literacy in Southern Africa suggested otherwise. The author stated that despite the efforts of implementing participatory approaches of learning - as is the modern educational model - some communities still adhered to the traditional school system[1] and viewed it as a positive concept[2]. In fact, the people of Durban, South Africa, rejected the participatory approach of learning and

[1] The traditional school system is part of the dominant paradigm of modernization, diffusion of innovations (Melkote, 2003) and dependency in a core-periphery system (Dicken, 2007).

[2] An idea later contradicted by Daniel et al. (2008) and Tharp and Dalton (2007) who believed that traditional classroom-based models of education were not the solution to the many issues encompassed by education in developing countries

felt more compelled to learn and teach in a traditional school environment, mainly because they yearned to be like the elite who had access to a formal education (Papen, 2005), inherently driven by colonialism.

As such, the influence that developed countries have on developing countries does not go unnoticed (Brown et al., 2005). Brown and his colleagues' (2005) study on the accounting of the Pacific Islands – a region where oral communication is prominent – illustrated that developed countries influenced LDCs because there was a great exposure to Western-written formats of communication through Western universities. In contrast, Brown et al. also discussed Wallace's (1999) suggestion that imported systems were ignored because they did not serve the needs of the developing economy of the region.

Lavers (2008) and Kowal (2008) echoed Bernstein (1971) and Makuwira's (2006) thoughts as they firmly believed that development work should be focused on assessing the needs of the people in a community in order to provide them with the right knowledge and opportunities to make informed choices rather than imposing foreign priorities. Having said that, it is argued that when people make decisions that go against their best interest and end in suffering, outsiders are allowed to intervene (Lavers, 2008). However, Lavers (2008) insisted that those who intervened insinuated that people in the communities they integrated were not capable of making their own decisions. Goals are socially and culturally constructed locally (McGregor, 2004) and an intervention that opposes someone's views is also perceived as a restriction of their freedom (Lavers, 2008; see also Makuwira, 2006).

Lazerg (2009) explained that the ways in which colonial empires were legitimized should be understood. In fact, while the British Empire's political rule was justified by the fact that Natives could not rule themselves, today some countries have control over others, stemming from the

same logic (Lazerg, 2009). However, Lazerg further asserted that a return to the colonial logic to solve current problems emerged from an increased power imbalance between the North and the South.

Lack of context. Various authors would agree that context is fundamental when implementing societal changes, including changes in education (Kowal, 2008; McKeough et al., 2008; Motakef, 2007). Today, the curriculum must be culturally appropriate, an idea shared by the First Nations people who believed that foreign teachers do not have the full ability to teach children about their own culture because they do not understand the aboriginal worldview (McKeough et al., 2008). Educational programs that keep the local context in mind are usually successful (Tharp & Dalton, 2007). For example, Tharp and Dalton's (2007) case study of the Kamehameha Early Education Program (KEEP) in Hawaii on whether Western pedagogy was the best not only demonstrated that transplanting the same program in the American Indian Navajo nation proved to be completely different because of social differences, but also that Western pedagogy cannot be adapted to every culture, concluding that teaching should be managed through cultural concerns.

Dependency Theory

Defined as the relationship in which the satisfaction of needs of one party is controlled by the resources of another party, dependency theory offers another perception of development and serves as the main challenge to modernization theory (Ball-Rokeach & Defleur, 1976; Gunder Frank, 1967; Hendelman, 2003; Melkote, 2003; Singh, 2003). Usually applied in the context of developing countries, dependency theory rejects the idea that these countries should follow a linear path laid out by Western ideals (Ball-Rokeach & Defleur, 1976; Hendelman, 2003; Singh, 2003).

Being one of the pioneers of dependency theory, Gunder Frank (1967) argued that the main effect of capitalist development was the increased dependence of developing countries to wealthier nations, emerging from a global division of labor in which the industrialized countries became dominant in a core-periphery configuration (Dicken, 2007). Dicken (2007) noted that this global economic shift has rendered Sub-Saharan Africa the biggest case of poverty and poses one of the biggest social challenges of the 20th century.

Gunder Frank (1967) defined dependency theory as the integration of all members of a societal system through close economic, political, social and cultural ties. In this societal system however, the metropolises (usually major countries like the U.S.A. and in Europe) have a monopoly over resources, and misuse and misdirection of these resources across the monopolistic system result in the appropriation of the economic surplus by the metropolises, leaving very little for those who need it most (Gunder Frank, 1967). This idea echoes that of cultural imperialism where LDCs have no control over their economic and political affairs (Jan, 2009). McLuhan and Powers (1989) explained it well when they argued that, "the commercial corporate organization is, after all, a broad extension of the human mind it develops controlling structures to organize human behavior to produce an economic benefit" (p. 121). Since culture is a resource and a context for social action, if a culture cannot meet basic needs for lack of resources, people have no choice but to rely on others and alter their identities in order to secure their basic needs (Gough, 2004).

Dependency in Practice

On the other hand, Botta (2006) suggested that dependency did not operate so easily. In his study on media dependency and the use of condoms in Zambia, the author demonstrated that the impact of media depended on whether media fulfilled Zambia's needs and how dependent

Zambians were on media to fulfill those needs. The results of his study showed that those with high exposure to media had a supportive attitude toward condoms only if they were dependent on media for HIV/AIDS information. Nevertheless, the study also suggested that media became an important information tool, as the dissemination of information through mass media about AIDS was necessary to reduce infection risks (Botta, 2006). Therefore, wouldn't Zambians become dependent of media if it served as one of their only sources of information? Media being a predominantly Western invention, wouldn't cultural imperialism, as well as Song and Zhang's (2008) cultivation theory, be appropriate to analyze this context given that the media has an influence on the attitude of Zambians?

Indeed, the Internet has become a source of information that people depend on in developing countries. A study conducted by Riffe, Lacy and Varouhakis (2008) on the frequency of use of the Internet in the United States concluded that a third to a half of the people studied depended on the Internet weekly to get specialized information, and at least half the people depended on the Internet to research health information. While the use of the Internet is still low in many regions of the world, Internet use in the poorest regions is increasing at a very fast rate (Internet World Stats, 2009). Indeed, both Africa and the Middle East's Internet use between 2000 and 2009 increased by more than 1,000% (2009). Following this conduct, will developing countries become increasingly dependent on technology for their information, especially in the educational sector with the introduction of the XO laptop where the Internet is the main source of information? If so, how will it affect society as a whole? Unless local content is produced and promoted, developing countries may depend on foreign information that may not be sustainable for their development.

The spread of new media in developing countries brings to light dependency and modernization issues about the XO laptop. As such the question arises: will this technology bring external ideas into communities affecting their choice for sustainable living because it gives access to the Internet? Conversely, are these new ideas indispensable to their development? (Baskaran & Muchie, 2006).

Postmodernity

Postmodernity encompasses a new way of looking at development, creating new worldviews to improve the human condition (Bezanson & Sagasti, 1995). Developed after the Second World War, postmodernity serves a rejection of modernization and the capitalist movement (1995). Musa's (2009) exploration of West African media during colonial times illustrated an example of this rejection, a phenomenon that Kowal (2008) described as *self-determination.* As the indigenous elite was against colonial rule because it imposed a British-imported economic structure that put Africans to a disadvantage, resistance to the European rule was manifested through indigenous media (Musa, 2009; see also Makuwira, 2006). Post-independence institutions emerged from this opposition and the need for information and advertising increased, which pushed many contemporary educated Africans to study journalism (Musa, 2009).

While in the search for new meanings for development and progress, Bezanson and Sagasti (1995) believed that lessons should be learned from what has been done in the past. The authors suggested that the capacity to acquire knowledge should be enhanced, that participation and decentralization of power have become essentials, that creating the right sustainable environment helps create the right setting for development, that local problems should now be perceived from their national consequences, and that environmental concerns should be taken into consideration (1995). However, the question still remains as to how these suggestions should be implemented

in developing countries while focusing on local matters within a universal framework. Surely, Uganda already took local measures as its parliament recently put a ban on imported electronics (refrigerators, televisions, computers, etc.) because the country lacked a waste management system, causing massive pollution, which mainly affected health (Namutebi, 2009).

On the other hand, Banerjee (2009) did not share a similar hope. He believed that while Western consultants played a major role in transferring their knowledge into developing countries today, they were brought to shape urban landscape to mirror those of the West, mostly looking to serve the global economy rather than the local context. The challenge for developers is thus to create local innovations for long-term capacity building (Banerjee, 2009). Accordingly, it can be presumed that the elements used to create Bezanson and Sagasti's (1995) new worldview may still be perceived as the modernization of developing countries. How is this new idea of development any different if it generally stems from the West? Conversely, can developing countries innovate without tools provided by the West?

Having said that, the McBride report was issued by UNESCO in 1980. After colonial times, the United Nations found it imperative to discuss the new world order in order to give a voice to the poor. Indeed, this report mainly suggested eliminating inequalities, monopolies, instituting a free flow of information, freedom of press and information, insure the capacity for developing countries to reach self-sustainability and the respect for cultural identity (Fore, 1982). It is with this in mind that new visions of development have come about, especially with the introduction of ICTs for Development (ICT4D).

The literature on modernization is very critical and depicts it as a negative impact on developing countries. However, some believe that modernization can be instrumental for the survival of those countries (Baskaran & Muchie, 2006; Hendelman, 2003; Ludlow et al., 2008;

McGregor, 2004). Although modernization can generate economic growth, it can sometimes have repercussions in other areas, such as rural development, as it did in Vietnam, where the use of the Vietnamese language for development accounted as a factor for the poverty gap because ethnic minorities did not speak the language, rendering communication between the rural and urban areas difficult (Van de Fliert & Do Thi Minh, 2009).

Information and Communication Technologies for Development

Adeya (2002), Baskaran and Muchie (2006), Mansell and Wehn (1998), the MDG Report (2008), Paré (2005), and the UNDP (2001) all reported that introducing ICTs in developing countries could lead to the development of social, political, and economic capacities of these countries. In fact, it is believed that IT technologies in the 21st century will have a major influence on politics, economies and culture of countries around the world (Chen, Gao & Tan, 2006). In China, ICTs have already penetrated all aspects of people's lives and have already affected their habits (2006). The SARS epidemic showed the powerful use of ICT because although people were not leaving their homes, they were still communicating online via mobile phone for online education and commercial activities (2006).

Apart from OLPC, many educational ICT projects have already been put in place, such as the Enlaces program in Chile (Hinostroza, Hepp & Laval, 2000) and SchoolNet in Thailand (Kiattananan & Koanantakool, 1999), which yielded positive educational outcomes. Some of these projects have helped people - women in particular - gain self-confidence (Dlodlo & Beyers, 2009; Gatua, 2007). For example, the Feminist International Radio Endeavour (FIRE) – a women grassroots' community radio in Costa Rica – has given women a voice and hopes to be reproduced in Kenya where women feel voiceless (Gatua, 2007). In doing so, the advancement of ICTs allows the possibility not only of bridging the digital divide, but also of satisfying basic

needs. Yet, it is astonishing that many still cannot meet their basic needs despite all the technologies in the world, (McGregor, 2004).

As previously stated in the Zambia example (Botta, 2006), some are afraid that negative dependency toward mass media will result from the introduction of ICTs in developing countries (Ball-Rokeach & Defleur, 1976; Jan, 2009; Melesse & Morales-Gomez, 1998). In fact, Jan (2009) illustrated how some African epidemics of infant diarrhea and mortality find their source in European and American television programs that advertize bottle-feeding versus breast-feeding, a practice that transpired to be unsustainable for Africans. Having said that, commercial endeavors often hold a powerful grip on media, but Gatua (2007) warned that media should also be socially responsible. The following question can thus be posed: Should developing countries be denied the opportunity to develop through technologies because of their possible misuse? Yet, Melkote (2003) argued that:

> [B]y exposing individuals to new people, ideas, and attitudes through the mass media, they accelerated the process of modernization. People in the Third World could expand their empathy by exposure to the mass media had the potential of blowing the winds of modernization into isolated traditional communities and replacing the structure of life, values and behavior with ones seen in modern Western society. (p. 134)

It is thus clear that the tension between modernization and the diffusion of new technologies in developing countries rests in Melkote's quote. The question remains as to whether this process is inevitable for the development of these countries.

The Digital Divide

The digital divide can be described in many ways. Simply put, it is the gap between those who have access to resources to participate in the information age and those who do not (Chen &

Wellman, 2004). In this sense, the digital divide is difficult to bridge (UNDP, 2001) considering ICT use is very limited in most parts of the world. As a result, access to ICTs and their benefits has become the main issue (Howkins & Valentin, 1997). Actually only a little over 18% of the world population had access to the Internet in 2006 (MDG Report, 2008). Today, while the rate of penetration of the Internet is rapidly increasing, only about 25% of the world population has access to the World Wide Web (Internet World Stats, 2009). In 2001, four out of five websites were in English, while only one out of 10 people spoke the language (Kickbusch, 2001). Although the spread of the English language increased with 2.3 people out of 5 now speaking the language (Language is Everything Half Year Report, 2007; World Population Data Sheet, 2007), these statistics portray not only the electronic divide, but also the language barriers created by ICTs.

Language barrier. Language is an important tool to structure and organize life experiences and this process is mainly influenced by culture in the ways we interact and communicate (McKeough et al., 2008). Therefore, the developed world's teachings of dominant languages (such as English and French) create a threat to smaller cultures. In fact, Leavitt (1995) argued that, "language leads to fundamental differences in how the world is viewed, how knowledge is conceptualized and categorized, and how one relates and interacts with others" (as discussed in McKeough et al., 2008, p. 149). Hence, the production of local knowledge is a necessity as language creates meaning and conveys values, beliefs, customs, and practices of culture, creating a specific identity (McKeough et al., 2008).

Still, countries like Botswana teach the English language to their students (Chapman et al., 2003) giving them the tools to try and bridge the digital divide and to adapt to the current global economy, mostly dominated by the English language. However, Chen and Wellman (2004)

noted that, "the digital divide reflects the broader context of international social and economic relations: a center-periphery order marked by American dominance" (p. 41). Still, the colonial past of countries like Botswana cannot be forgotten, as English became part of their current identity.

The educational divide. In her qualitative study on the relationship between literacy and health in Africa, Kickbusch (2001) illustrated the importance of focusing on education rather than on the dissemination of ICTs. Illiteracy reinforces health and economic inequalities (Kickbusch, 2001) and bridging the educational and health divides must be a priority (Adeya, 2002; Kickbusch 2001; MDG Report, 2008). This divide is often associated with the diffusion of innovation, as it is believed that diffusing innovation can bridge the information gap between developing and developed countries (Basu & Weil, 1998).

Seeing that ICTs can bridge the digital divide, but also widen it, the XO laptop may help resolve this debate. By ultimately wanting to distribute this technology to all countries alike, this technology attempts not only to close the digital divide, but also to reduce the educational divide by offering access to information to all children worldwide (Appleyard, 2008).

The Diffusion of Innovation

Developed by Everett Rogers (2003), the diffusion of innovation theory is defined by, "(1) an innovation (2) that is communicated through certain channels (3) over time (4) among the members of a social system" (p. 36). Interestingly, this theory has had some criticisms concerning the socioeconomic gaps often widened through the spread of new ideas, mainly because of poor access driven by the expensive costs of ICTs (UNDP, 2001) raising issues of inequality (Rogers, 2003). Also, it was shown in Botswana that there was a difficulty to replace old habits with new ones and that they tend to sit side by side (Bisaso, Kereteletswe, Selwood, &

Visscher, 2008), making the diffusion of innovation relatively unsuccessful. On the other hand, studies showed that using appropriate diffusion strategies could generate higher equality in a society (Basu & Weil, 1998; Röling, Ascroft & Chege, 1976; Shingi & Mody, 1976), as the XO laptop tries to do.

Lack of context. Still, context is often omitted during diffusion (Ellul, 1964; Rogers, 2003), something modernization theory was also criticized for. For example, a mixed methods study examining the use of ICTs in Syria by high school English teachers (Albirini, 2006) illustrated that technologies often missed the cultural context of a society, also known as *cultural incompatibility* (Rogers, 2003), a feeling echoed by Ugandans who used computerized information systems (Bisaso et al., 2008). This omission often leaves users weary of the technology because they fear it may change their traditional cultures and social life, as they are concerned by the influence of other cultures over their own resulting in misguided behavior, especially in younger generations (Loch et al., 2003, as discussed in Albirini, 2006).

Given that much of the diffusion is done between the West and developing countries, Banerjee (2009) believed that Western ideologies often transferred along with technologies and affected the outcome of the innovation. Consequently, the cultural non-neutrality of new technologies is a major setback in the implementation of ICTs in developing countries (Damarin, 1998, as discussed in Albirini, 2006). Alternatively, Basu and Weil (1998) argued that technological improvement might occur from spillovers from multiple countries, something Negroponte – chairman of OLPC - supports (Appleyard, 2008). Nonetheless, questions of modernization can be raised within globalization through technical innovation.

Through the diffusion of the XO laptop, it can be argued that only one context is taken into consideration: non-industrialized countries. Then again, the laptop's open source concept permits

the shaping of the technology to the society, adapting it to its context. However, would Banerjee (2009) object to this idea given that Western ideologies may transfer along with the laptop and change the outcome of the innovation? Therefore, this study demonstrates how cultural context needs to be taken into consideration in an ICT project.

Globalization

After the cold war, globalization was thought to be behaving the same way as colonization (Lazerg, 2009). With an assumed attempt to help developing countries, Lazerg (2009) explained that structural programs have not only been introduced to accelerate the export and import processes, but have also opened doors for liberalization and democratization. These processes have helped accelerate life and leapfrogging – defined as the introduction of ICTs where they were previously non-existent and skipping the usual intermediary steps to build that technology (Toffler, 1991; see also Davidson et al., 2000; Makuwira, 2006) – is presented as a solution to support the global competitiveness of countries that lag behind (Davison et al., 2000; James, 2001), leading to economic prosperity. In the knowledge society, knowledge becomes the basis for competitiveness (Drucker, 1994, as discussed in Mansell & When, 1998).

Globalization opens doors to technological innovation, global expansion, and educational opportunities, such as distance learning (Adeya, 2002; UNDP, 2001; Scholte, 2000). It also brings foreign investment and economic opportunities in which ICTs are considered to play an important role (Jacobson, 2004, see also Bezanson & Sagasti, 1995). Moreover, Habwe (2009) trusted that globalization had the potential to unite people. In fact, he illustrated that globalization enforced the use of Kiswahili in East Africa, providing a strong bond within the region and provided people with an identity, common thought and vision where it was previously non-existent. However, although there was a major effort to keep the Kiswahili language,

capitalism and economic globalization made people more inclined to learn English, as it was believed to secure jobs for their children (Habwe, 2009)[3].

Already more than 10 years ago, Bezanson and Sagasti (1995) recognized that the global economy was constantly changing, and they considered it imperative for developing countries to take part in the transformation in order to survive. More than ten years later, Dicken (2007) proposed the same idea:

> If the 'triad' [in reference to North America, Europe and East Asia] does represent a functional reality (actual or potential) then it poses major problems for those parts of the world – notably the least developed countries - which are not integrated in the system. In fact, although developing countries, as a group, have increased their share of global exports and of inward foreign direct investment, their share remains very limited. (p. 39)

From this quote, it appears that the monopoly of the developed world causes difficulties for developing countries to expand economically. Most important, it is difficult for rural communities to participate in the economic growth because they are usually stricken with high unemployment, loss of population and a shrinking economic base (Ludlow et al., 2008; Tiejun, 2007).

From a different perspective, Gunaratne (2009) argued that the concept of globalization was bias and lacked universalism because it had been described from a Western perspective. In fact, the author believed that the neglect of non-Western views into social science has turned European universalism into universal universalism. He further concluded that the discourse of globalization was a simple extension of the dominant paradigm of modernization and

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[3] This topic relates back to the language barrier issued by the digital divide.

development (Gunaratne, 2009). From this perspective, does OLPC take part in the universal universalism discourse by offering the possibility of universal education for social change?

In sum, globalization springs from the need for economic expansion, currently aided by ICTs. Although it has many benefits for developing countries, challenges of inequality and access emerging from this process cannot be ignored. However, we are to wonder if the positive outcomes outweigh the negative ones when implementing ICTs in developing countries, thus questioning whether this inculcation should continue or whether developers should find other avenues for economic prosperity.

The Benefits and Challenges of ICT Implementation

Although there are many benefits to the implementation of ICTs, there can also be many challenges hindering the implementation. Benefits of ICTs can be condensed into five points: (a) ICTs help leapfrog stages of development, accelerating the process (Adeya, 2002; Davidson et al., 2000; James, 2001; UNDP, 2001; Mansell & Wehn, 1998); (b) Acquiring ICTs can bring great socioeconomic transformation as they help develop cognitive skills such as literacy and marketable skills (Adeya, 2002; Baskaran & Muchie, 2006; Ellul, 1964; Paré, 2005; UNDP, 2001); (c) ICTs have the potential to empower people (Adeya, 2002; Baskaran & Muchie, 2006; Melesse & Morales-Gomez, 1998; UNDP, 2001); (d) ICTs increase information flow locally and globally, opening doors for economic growth, foreign investment and global alliances (Adeya, 2002; Baskaran & Muchie, 2006; Foray, 2004; James, 2001; MDG Report, 2008; Singh, 2003); Finally, (e) ICTs can facilitate poverty alleviation (Baskaran & Muchie, 2006; MDG Report, 2008; UNDP, 2001). This last point is the main goal of OLPC as it aims to end global poverty through education.

While many countries are lagging behind in the PC-based Internet use, others are adopting mobile phones (Chen & Wellman, 2004). Indeed, Banks (2009) noted that Africans were not the passive receivers of technology that many think they are. Actually, East Africa is the leading innovator of mobile payments as they adapted an available technology to a local initiative (Banks, 2009). The XO laptop seeks to provide the basis for this type of innovation but with more information at hand. The arrival of the Internet has the potential to boost innovation in Africa and other developing regions around the world.

Although these are all great incentives to introduce ICTs in developing countries, there is still a general agreement that without the right policies in place, these countries could not enter a global economy and reach poverty alleviation (Basu & Weil, 1998; Davidson et al., 2000; Hendelman, 2003; James, 2001; see also Heuty & Reddy, 2008; Mansell & Wehn, 1998; Melesse & Morales-Gomez, 1998). In fact, Jan (2009) pointed to the importance of media policy as a system of institutionalized governance over structure and conduct.

Different factors render poverty alleviation more difficult to reach than expected (Brown, 2001, as discussed in Adeya, 2002). Apart from the dependence to ICTs that can be created by their introduction (as explained in the *Dependency Theory* subsection), access to these technologies is the biggest issue, mostly because of their high cost. Fortunately, some countries have been working on lowering the cost of access, like Thailand for example, where the Internet has become part of Thai life with 18 commercial providers available. Because Thailand is not a rich country, the government provided three free services for government, schools, and Thai citizens (Bhattarakosol, 2003).

Due to its creation under a new vision, the XO laptop could solve the dilemma of unequal access as it aims to provide the technology to all children around the world without exception. In

fact, Appleyard (2008) restated Dan Shine's comment that Negroponte may have accelerated people's access to information by probably years. Moreover, the organization hopes to reach a point where countries would receive the laptops solely through donations, rendering the laptop virtually free for developing countries.

However, technology alone cannot resolve social exclusion issues (Boily, 2004; Melesse & Morales-Gomez, 1998). Despite the elaboration of fair policies, Makuwira (2006) illustrated in his study of media in Malawi that the media are still controlled by a few powerful elites, despite liberalization of airwaves and freedom of the press. The author further demonstrated that lack of participation and social control had marginalized the majority of Malawians.

Lack of training. ICT use also persists as a big challenge (Bisaso et al., 2008). For example, Dlodlo and Beyers' (2009) study concluded that girls were underrepresented in science, engineering, and technology fields in South Africa mostly because girls were not familiar with computers and their possibilities. Since women have less experience then men with computers, the authors demonstrated that they tended to have a more negative attitude towards it. Grace and Kenny (2003) insisted that LDCs needed training to engage both in the global market through operating e-enabling activities as well as global exchanges. However, the authors believed that perhaps this should be done outside the traditional education system.

The Internet. Most important, there is a particular focus on the benefits of the Internet in recent literature (Adeya, 2002; Grace & Kenny, 2003; MDG Report, 2008; UNDP, 2001). Although the benefits of the Internet in LDCs remain little evaluated, Internet access in education is believed to have the potential to equalize access to education, individualize interactivity, and acquire the skills needed to succeed in the digital age (Grace & Kenny, 2003). The Internet, as opposed to radio, gives access to much more information, opening doors for

global expansion and economic prosperity. However, the high cost of the Internet is still a major setback for LDC schools (Adeya, 2002; Grace & Kenny, 2003) (as well as unsustainable practices imported from foreign content), which is why interactive radio instruction (IRI) is currently more cost effective (Grace & Kenny, 2003). In fact, radio is considered to be the best low-cost media available for most African communities considering that it is effective for places with high illiteracy rates (Gatua, 2007).

Nonetheless, Grace and Kenny (2003) believed that ICTs should have a growing role in the educational system of LDCs. However, even though the Internet has the potential to increase skill building in developing countries, it is still too expensive for lower income LDCs, so access to the technology is denied to those with little access to electricity or a telephone line (Grace & Kenny, 2003).

The Internet has been diffused between and within countries with different socioeconomic, technological, and linguistic factors. Lack of infrastructure, policies, and education have been factors that put a halt to the use of the Internet in developing nations (Chen et al., 2006; Chen & Wellman, 2004).

Adeya (2002), Melesse and Morales-Gomez (1998), Melkote (2003), Singh (2003), Paré (2005), Bezanson and Sagasti (1995) and Davidson et al. (2000) all agreed to some extent that access to ICTs were beneficial to reduce the digital divide, improve life conditions, and alleviate poverty. In contrast, these scholars acknowledged not only that access to ICTs was a concern, but also that access to the generated information was problematic. Unequal distribution of technological advances creates social damage provided that those who have access learn faster and are given the opportunity to affect significant change (Bezanson & Sagasti, 1995).

So long as the focus is on people, the general belief is that technologies give the opportunity to accelerate the improvement of life conditions. Given that new technologies can have negative impacts on societies, should OLPC still give the opportunity for developing countries to prosper economically? In doing so, life conditions could be improved while simultaneously applying modernization. On the other hand, Van de Fliert and Do Thi Minh (2009) argued that technology-oriented solutions have not proven to be as effective as needed and that the participatory approach seemed to be working more efficiently. Still, while applying the participatory approach as one of its educational elements, could the XO laptop be an effective technology-oriented solution?

The Diffusion of ICTs

Although people are taught *how* to do something, decision-makers want to know *why* they should be using a certain technology before they embrace it (Burniske, 2003). In fact, Rogers (1995) warned that when a technology is diffused, people often neglect to explain why the community *should not* use the technology (as discussed in Burniske, 2003).

Burniske's chain of doing. Burniske (2003) believed that the process of diffusion through lack of information forced people into the chain of doing. He believed that when using educational technologies teachers were presented with choices (which certain circumstances force upon them) that could eventually make them dependent on the technology. Unless they understood those choices, they would be forced into the chain of doing. Actually, he further explained that teachers do not have freedom of choice when presented with the choice of curricula (standards or standardization), the choice of hardware (PC or Mac, they often do not have a choice since they receive computers as donations), the choice of software (genres or brands, also influenced by the donor. This also shapes the way the virtual world is seen), the choice of destination (pedagogical

process or products), and the choice of cultures (freethinking or thought collective). Burniske warned educators that they must be aware of thought collectives that shape worldviews. When initiated to a subculture, one accepts the system of information and the new perception of the world for which they did not have a choice in the first place. The author noted that the resistance to technology from developing nations showed their desire to preserve their own culture rather than becoming another link in the chain.

Questions about the XO laptop can be raised according to Burniske's (2003) chain of doing. In fact, the XO laptop offers somewhat of a choice to developing countries. First, it seems as though only those who ask for the laptop will receive it, meaning they have made a choice in the hardware they want to use. Second, while users do not have a choice in the software, they are able to change the software at will because of the laptop's open source concept. Therefore, the software is shaped according to one's worldview. By shaping their own software, the people have a choice on how to use the laptop according to their personal needs. Having said that, does the XO laptop still force countries into the chain of doing? Unless users understand the opportunities that the laptop could provide, then countries will be forced into the chain of doing because they will only think about what the machine does and not what the machine can do.

ICTs and Education

In order to raise the number of primary school enrollment as well as graduating rates, Ludlow et al. (2008), among others, proposed introducing technologies to education. In fact, Grace and Kenny (2003) illustrated that ICTs had long been part of the education system and new ICTs had the potential to assist education. For example, SchoolNet South Africa - an organization that aims to promote the use of ICTs in Southern Africa - partnered with companies to provide

technology and Internet access at low cost using open source software (Halse & Terzoli, 2002), a process very similar to OLPC's.

Various ICTs have been used to enhance education. So far, IRI and televised education have made their mark as effective educational tools in LDCs (Grace & Kenny, 2003). In fact, televised education has proved to be equally as good as regular education in Mexico (2003).

Having said that, establishing a good education system is important, given that developing countries have limited access to ICTs (Adeya, 2002). As such, educational technologies should only serve as mediators in the learning process (Burniske, 2003; Newhouse, 2002). Burniske (2003) clearly described this process with the following statement: "Stop thinking of technology as the subject for study and start thinking of it as a vehicle for the study of a subject" (p. 60). This mediation is depicted in Descorte's (1990) idea of a powerful computer learning environment comprised by the balance between discovery learning and personal exploration on one hand, and systematic instruction and guidance on the other (as discussed in Newhouse, 2002). In fact, knowledge construction based on what the children already know and believe constitutes the modern vision of learning (2002).

This vision is what OLPC aims to establish through the XO laptop. Based on Papert's (1993) constructionist theory – which advocates the construction of knowledge through a personal set of experiences – and in collaboration with Papert himself, the technology aims only to assist education in primary schools in the hopes of creating social change, leading to poverty alleviation. The SchoolNet South Africa program showed that despite the fact that many schools are ICT-disadvantaged, it is possible to provide modern, high-quality network services to schools (Halse & Terzoli, 2002). Halse and Terzoli (2002) believed that the requirements of open solutions for developing countries were much lower than modern commercial software; an

important element to bridge the digital divide in countries where these technologies are limited. It can thus only be assumed that the XO laptop would serve as an effective technology-oriented solution.

ICTs in Developing Countries

The introduction of the PC changes pedagogic methods and enhances the interactive experience assisting in the development of more cognitive skills (Grace & Kenny, 2003). However, computer training is limited in LDCs because of its low use, leading to low value of the machine, leading to low use, creating a vicious circle (2003). On one hand, people who use computers in LDCs have better wages. On the other hand, if more people start using computers, wages will drop because it will become more common for people to have that knowledge (2003).

Furthermore, it is believed that educational information transmitted through media facilitates social change (Melkote, 2003; Singh, 2003). In fact, Melkote (2003) stated that, "at the individual level, they influence awareness, attention, and behavior toward a socially desirable objective, and at the larger, community level, they serve as an agenda setter to influence public and policy initiatives in a socially desirable direction" (p. 137).

When coupled with education, ICTs are considered perfect tools for empowerment (UNDP, 2001; Papert, 1993). In fact, some universities already have web-based education in place such as the University of Botswana and the Indira Gandhi National University (UNDP, 2001). In Thailand, e-education strategies aim to reform Thailand's unequal education system, which usually favours students in urban areas (Bhattarakosol, 2003). Conclusively, ICTs are introduced into the education system for the benefits it could create for human development (Adeya, 2002; Baskaran & Muchie, 2006).

In spite of that, educational technology shapes a student's perception of the world (Burniske, 2003). Teachers who are introduced to educational technology in developing countries are automatically indoctrinated to a dominant approach of using the Internet (2003). For example, during postcolonial times, Britain was still making its mark in Africa as the British institutions were still in place and professors were trained in Western universities. Consequently, the study of media under Western influence affected the development of universities and societies, such as a shift of focus from the people to the economy as a consequence of the economic globalization (Musa, 2009; also see Makuwira, 2006).

As such, it is imperative for developing countries to view technology critically and use it to find meaningful information (Burniske, 2003). Although Chen and Wellman (2004) implied that within developing nations the divide is widening because of the low number of people who use the Internet and the consequences of not being online, Burniske (2003) debated that sometimes, teaching survival skills was more important than IT training and people who have IT training see no use for it. He therefore asked whether computers were necessary in such cases.

It can thus be discerned that OLPC's technology distinguishes itself from other laptops on the market as it offers a solution for local matters within a Universal model. However, some may fear that operating the same Western technology on a global scale would overlook local context and would implement a Universalist model, as well as a widening of the digital divide through the diffusion of this innovation. On the other hand, its open source concept offers society the opportunity to shape the technology according to its individual context. As a change agent (Rogers, 2003), OLPC aims to affect positive change in developing countries by giving children the opportunity to participate in the global village (McLuhan & Powers, 1989) based on knowledge acquired through education. As such, I pose the following research questions to

explore the tension between modernization and the diffusion of a new form of educational ICT, in this case, the XO laptop, for poverty alleviation in the developing world:

RQ 1: What were OLPC's initial strategies in the diffusion of the XO laptop? Do these strategies reflect an attempt to help close the digital divide between developed and developing countries?

RQ 2: Does the XO laptop act as a catalyst for the positive transformation of societies in developing countries?

RQ 3: Toward what vision is the reconstruction of knowledge directed through the use of the XO laptop?

Summary of Chapter

This chapter reviewed different studies on education and ICTs, and the integration of both within the development discourse. Mainly, the chapter explained how the main focus of development was to provide developing countries with more comfortable lives, meaning it wants to enhance people's well-being. In order to do so, education has been deemed as one of the most important tools. However, it was also important to note that there was no universal blueprint for education in developing countries, let alone a blueprint for development. Indeed, education and development should be adapted to the local context. Having said that, education is believed to provide empowerment, which is described as the capacity to make decisions and take control of a situation. New visions of development recognize empowerment through the application of the participatory approach and democracy. By applying those new practices, it is often said that modernization and dependency are at hand, even though postmodernism has taken over the dominant discourse of colonial times. Nonetheless, some are still weary of new practices because although they may appear noble, they may pose as colonization in disguise. Conversely, others

believed that modernization was instrumental to the development of countries in order for their population to survive. It is not uncommon today to consider modernization through the implementation of ICTs in developing countries, especially for the benefit of education. Indeed, it is believed that those technologies have a major influence in all aspects of society, whether it is political, economic or social. Although ICTs have many benefits, they also pose many challenges, such as the widening of the digital divide, which is described as the gap between those who have access to ICTs and those who do not. Access to technologies is the main issue of the digital divide. As such, this divide is often fueled through the diffusion of innovation – defined as, "an innovation that is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 36) – only if the diffusion is not sustainable or unequal. This diffusion not only serves as a basis for the digital divide but it has also been criticized for its lack of context. Consequently, the cultural non-neutrality of new technologies is a major setback in the implementation of ICTs in developing countries.

Moreover, the unequal and unsustainable implementation of ICTs can lead to positioning developing countries within Burniske's (2003) chain of doing, which entails submitting to the subculture created by Western ICTs. Having said that, many still believe that ICTs are a necessary tool for education in developing countries, as it will help them leapfrog development through new methods for the improvement of cognitive skills. However, some authors warned that ICTs should remain mediators in the learning process rather than the main topic of education as ICTs shape a student's perception of the world.

The following chapter looks at the methodology used in order to answer the three research questions yielded by the literature review. It also details the data-collection and analysis tools used to answer those questions.

Chapter 3: Methodology

As the purpose of the research is to explore the tension, if any, between modernization and the diffusion of a new form of educational ICT for poverty alleviation in the developing world, a qualitative analysis of the initial strategies in which the XO laptop is implemented becomes imperative to answer the three main research questions:

RQ 1: What were OLPC's initial strategies in the diffusion of the XO laptop? Do these strategies reflect an attempt to help close the digital divide between developed and developing countries?

RQ 2: Does the XO laptop act as a catalyst for the positive transformation of societies in developing countries?

RQ 3: Toward what vision is the reconstruction of knowledge directed through the use of the XO laptop?

This chapter will be divided into three sections: it will first evaluate the information needed to conduct the research followed by an overview of the data-collection methods, the sample used, and the data analysis. The chapter concludes with ethical considerations and issues of trustworthiness.

Through its ability to give sense to a complex situation (Cox, Geisen & Green, 2008), a qualitative analysis (Cox et al., 2008; Padgett, 2008) of this case study helped me comprehend how the strategies implemented by OLPC affected the development of the XO laptop and the relationship it created between developed countries (in which the laptop is developed) and developing countries (in which the laptop is diffused). As such, understanding the meaning of OLPC's initial strategies established the vision that the nonprofit organization had for the ultimate goal of global poverty alleviation. This instrumental case (Miller & Salkind, 2002) thus

aims to show how the current diffusion of innovation is integrated within the new vision of development – which involves participatory action and empowerment – making both current structures and new phenomena visible (Cox et al., 2008).

Using a case study became highly relevant as it supported the investigation of the phenomenon of diffusion (Bloomberg & Volpe, 2008) through discerning the patterns of this specific process (Miller & Salkind, 2002). Moreover, case studies allow the in-depth understanding of a phenomenon through the collection of multiple forms of data (2002).

Therefore, a qualitative analysis enlightened the tension between modernization and the diffusion of ICTs, as its inductive nature – a process in which questions and concepts arise through the exploration of material acquired during research (Bloomberg & Volpe, 2008; Bonneville, Grosjean & Lagacé, 2006; Flick, 2007) - revealed the initial strategies used by the organization through exploration, understanding, and learning of this particular case (Cox et al., 2008).

Overview of Information Needed

Apart from the theoretical information yielded by the literature review (which generated a strong backbone to explain the phenomenon of diffusion of innovation for poverty alleviation), other information was necessary in order to understand the meaning of OLPC's initial strategies to answer my research questions. Certainly, different perspectives needed to be analyzed. First, it was important to understand the context in which the XO laptop was developed. To do so, collecting information on how the project started and understanding the characteristics of the laptop became imperative because those were the elements that drove OLPC's vision. Indeed, those elements are important for an understanding of OLPC's perception and motivation behind the project, as these aspects translate into the goals of the organization. Moreover, information

regarding the demographic installation of these laptops was also important to understand. Understanding *why* the laptops were going to specific people enlightened the tension between modernization and the diffusion of ICTs in developing countries. In order to gather this information, document analysis (Bonneville et al., 2006) and analysis of online discussions (Lindlof & Taylor, 2002; Marra, Moore & Klimczak, 2004) take on an in-depth qualitative examination of this case study.

Procedures: Data Collection and Analysis

Computer-mediated Communication

Humans are increasingly using computer-mediated communication (CMC) as a way to create and transform meaning (Lindlof & Taylor, 2002). As this form of interaction clarifies communication and allows the easy recording of data, analyzing CMC is important mostly because the findings may contradict theoretical claims (2002). Indeed, Lindlof and Taylor (2002) stated that observing such communication allowed the analysis of the use of language and nonverbal communication. As such, observation of such interactions helps evoke the cultural context described by the users (2002). Moreover, collecting and analyzing CMC data allows the researcher to be more objective because he/[she] can be detached from the participants (2002).

Accordingly, CMC allowed me to understand the way OLPC communicated its mission and vision to the public. The nonverbal communication applied by the organization provided me with an objective perspective of the initial strategies. If verbal communication were analyzed, a more emotional attachment to the project may have developed, rendering a subjective perspective. Thus, CMC enriched my study because it helped me look at the culture of OLPC from an objective point of view, rejecting preconceptions of the organization's project.

Document Analysis

Document analysis works in five steps: (1) acquiring the documents; (2) protocol development and data collection; (3) data coding and organization; (4) data analysis; and (5) report (Altheide, 1996). It focuses on how language is used in certain contexts as it is central to social interactions (Rapley, 2007).

As a non-intrusive technique, document analysis serves the purpose of understanding particular phenomena (Krippendorff, 2004) while discovering the significance of a message through the codification or classification of the analyzed document's elements within various categories, a process known within document analysis as *thematic analysis* (Paillé & Mucchielli, 2008).

The procedure behind this type of analysis serves to locate, identify, retrieve and analyze documents for their relevance, significance and meaning (Altheide, 1996) by applying contrast and comparison principles that allow the discovery of patterns, trends and differences (Krippendorff, 2004). Accordingly, Rapley (2007) highlighted the importance of understanding the context behind a document because that is how they gain their significance.

Not only does thematic analysis bring out different characteristics from the document and enables the understanding of the precise meaning of the message (Bonneville et al., 2006), but it also serves the purposes of tracking and documenting (Paillé & Mucchielli, 2008). Paillé and Mucchielli (2008) explained that tracking looked to reveal pertinent themes relating to the objective of the research within the documents and that documenting went beyond this first analysis and looked for recurring themes in different documents, yielding similarities and differences.

As such, continuous thematic analysis (2008) of secondary documents was used for the examination of the deployment guide and country-specific deployment documents in order to understand the vision behind OLPC's initial strategies in the diffusion of the XO laptop to reach their goals of better access, knowledge construction, and lower costs for ICTs, ultimately leading to poverty alleviation. In fact, the analysis of these materials provided me with the perspectives, assumptions, concerns and activities of those who wrote them (Taylor & Bogdan, 1998), namely OLPC members.

Analysis of Online Discussions

Coupled with the document analysis, an analysis of online discussions facilitated an understanding of the diffusion of the XO laptop from various points of view. After obtaining suggestions by an OLPC member, mailing lists – written by both volunteers and OLPC field team members – were analyzed for the purpose of examining how the host country was receiving the laptops. The common description of a mailing list is very similar to the bulletin board system, where users post messages to a single address and respond to each other's messages (Lindlof & Taylor, 2002). Accordingly, interactivity has been described as having the greatest potential to promote critical thinking, problem solving and knowledge construction (Marra et al., 2004). As OLPC applied this concept, it found it imperative to discuss XO implementation with the population that used it. It is during those discussions that volunteers put forward their issues, concerns and suggestions about the XO laptop, with OLPC replying to their posts. This interactivity makes the analysis of online discussions an important element of this research as it looks to understand the relationship between those who deploy the laptop (OLPC) and those who receive them (volunteers). Certainly, analyzing online discussions through mailing lists helped codify the needs of the volunteers (Eysenbach & Till, 2001) and I was thus able to investigate

whether OLPC responded to those needs through their replies. It is through those responses that the initial strategies were ultimately revealed.

Research Sample

Although many other countries that use the XO laptop could have been studied, India and Nigeria were selected because they share the most similarities, yet are the most different.

Indeed, India and Nigeria were once very much alike. Both considered having subsistence level economies (Inglehart, 2000), India and Nigeria have very similar contexts: both countries have a substantial number of people living in extreme poverty (Sachs, 2006), most of the population lives in rural areas (Anyanwu, 2005; Sachs, 2006) and both face similar challenges in the face of democracy (Ashutosh, 2005). However, the main difference between both countries is that India has been able to attain levels of economy that Nigeria has yet to reach. Actually, although many still live in poverty, India's economy has reached an economic increase of 6% per year (Sachs, 2006). On the other hand, Nigeria's poverty line has increased from 46% in 1992 to 71.7% in 1996 (Anyanwu, 2005). This is mostly due to more than half the population lacking an education, an element proven to be detrimental to the alleviation of poverty (2005). Moreover, Sachs (2006) observed that within a 10 year gap, South Asia has seen a major decrease of extreme poverty as opposed to Sub Saharan Africa, which has seen a great increase of its population living in extreme poverty.

This is why India and Nigeria were interesting to observe. They both had the same base, but one of the regions was able to climb the economic ladder while the other still lingered behind. While both countries have the XO laptop implemented in some of their rural communities, it was appealing to see how the machine affected each community individually. By selecting documents drawn from India and Nigeria, I was able to explore different societies in which the

XO laptop was installed, thus obtaining a maximum variation sample in order to explore the biggest range of qualities across the documents (Flick, 2007). This type of sampling serves the purpose of the thesis, as the XO laptop aims to be a universal tool technically adapted to the context of a country only through language, keyboard structures, and hardware characteristics.

Deployment documents were analyzed for the purpose of the research. As previously stated, these documents were necessary to evaluate in order to understand in which perspective the XO laptops were implemented into communities. As OLPC's foundation is based on the concept of open source, all the documents analyzed were available on their wiki website (http://wiki.laptop.org). This wiki is a place for OLPC members and partners to share their experience with others, so as to learn from each other. In fact, a general Deployment Guide (2009), as well as Educational Activity Guidelines (2008) were developed in order for the general public to understand the vision in which OLPC works and both documents were accessible on their website. Therefore, these documents were very helpful in understanding the path that OLPC laid before countries that were interested in deploying the machine within their communities. In addition to the guides, the India/Khairat Chronicles (2007) and the Nigeria/Galadima (2007) deployments (describing the deployment within the Khairat and Galadima schools respectively) were analyzed, complemented by the online discussions that were available for each country.

Synthesis

Following both analyses, a thematic analysis (Paillé & Mucchielli, 2008) was conducted. This type of analysis enabled the search for themes through a careful reading of both the deployment documents and the online discussions through mailing lists. Using categorical strategies to assemble those themes facilitated the comparisons of the data, leading to a better

understanding of the research questions (2008). In fact, using codes as categories allowed for the easy retrieval and organization of the information yielded by the analysis of both texts. Then, using similarity and contrast principles (Lindlof & Taylor, 2002), the meaning of the emergent themes of the document analysis were analyzed against those of the analysis of the online discussions through mailing lists.

Essentially, each document was read and coded the same way: each sentence or paragraph within the document was color coded according to the theme (one keyword) that it related to, which was induced from the text. Some of these segments could be colour coded for more than one theme. In that case, the different components of that segment were analyzed individually. As such, this procedure was consistent throughout all documents (both deployment documents and online discussions through mailing lists). At the end of this thematic analysis, the themes proved to be recurrent throughout all documents and the most recurrent ones between both deployment documents and online discussions established the initial strategies used by OLPC in the diffusion of the XO laptop. These themes were first analyzed individually in the Results and Analysis chapter and then were framed under the research questions in the Discussion chapter.

Furthermore, the entries of the mailing lists were not chosen at random. While entries started in 2006 for both countries and continue to have entries to this day, the analysis was limited to the first two years of the installation because 2008 marked the year when Microsoft partnered with OLPC. Analyzing entries beyond that date would have yielded results that were not particularly relevant to the main research questions, which aim to look at the initial strategies used by OLPC in the diffusion of the XO laptop in developing countries.

Ethical Considerations and Issues of Trustworthiness

While there are some ethical questions to be considered when looking at CMC, such as consent and privacy (Lindlof & Taylor, 2002), both the deployment documents and the online discussions were available to the public. Although anyone can have access to those texts, it is also important to note that all anonymity has been respected by removing all possible identifiers from individuals and only a reference to their ideas has been used for the purpose of this research.

In spite of the fact that CMC is the most relevant tool for my research, it does present some issues of trustworthiness that need to be addressed. Indeed, CMC cannot confirm *true* identities of users and thus a verified performance by a member of the group cannot be read (Lindlof & Taylor, 2002). Lindlof and Taylor (2002) further explained that because the technique of CMC analysis observed nonverbal communication with no access to the environment in which CMC was being produced, the experience of membership failed to be addressed. By that I mean that the experience of interaction between the members of the group could have revealed the way they truly viewed the laptop – which cannot be observed with CMC – because physical nonverbal communication points to the true reaction of a person towards the machine. In this sense, because I had no access to the environment in which CMC was produced, the bloggers' described experiences could not be verified.

Having said that, the ideas and values expressed through communication using the deployment documents and online discussions were still valuable and trustworthy mostly because most of the users specifically identified themselves as members of OLPC (through the ideas they were expressing as well as the identification of their email address) or as volunteers.

Moreover, those who were against the laptop wrote frequently, assuming that the expressed ideas and values were deeply rooted in their way of thinking, making it hard to misrepresent.

Summary of Chapter

Following a thorough literature review, the methodology chapter presented the various data-collection and analysis tools used in order to answer the three main research questions:

RQ 1: What were OLPC's initial strategies in the diffusion of the XO laptop? Do these strategies reflect an attempt to help close the digital divide between developed and developing countries?

RQ 2: Does the XO laptop act as a catalyst for the positive transformation of societies in developing countries?

RQ 3: Toward what vision is the reconstruction of knowledge directed through the use of the XO laptop?

The process of CMC, document analysis, and analysis of online discussions through mailing lists were described. While analyzing deployment documents and country-specific deployments assisted in understanding deployment from OLPC's point of view, the analysis of online discussions through mailing lists complemented the document analysis as it looked at the deployment from the perspective of the volunteers. India and Nigeria were used as examples because they shared a similar background but grew apart in their struggle for economic prosperity.

The following section presents the results yielded from the document analysis and the analysis of the online discussions through mailing lists.

Chapter 4: Results and Analysis

In this chapter, the results of the document analysis and the analysis of online discussions through mailing lists will be reviewed. Both these analyses revealed the motivations and initial strategies of OLPC in their diffusion of the XO laptop. The results brought forth themes that supported the authors discussed in the literature review.

Document Analysis

The documents were analyzed from two different perspectives: the deployment side (how the laptops were sent into the countries) and the educational side (how the educational program was developed and applied through the laptop). It was important to look at both angles because it was only by combining these two aspects that the strategies were revealed. Following a short introduction of the context in which the laptops were deployed are the various themes that were identified across all documents. The India and Nigeria deployments were used as a support for the Deployment Guide (2009) and the Educational Activity Guidelines (2008).

Context

Before considering the themes, it is important to understand the context in which the laptops were deployed. This aspect was necessary to examine because it set the tone of the program and it helped me determine whether modernization was being applied.

While using universal concepts (such as the use of the image of an eye to describe the camera on the laptop) in order to adapt to each country, it was observed that the XO laptops were being deployed into rural areas – to pupils between the ages of 5 and 18 – that were already somewhat developed. Indeed, the schools either already had access to electricity or had access to electricity outside of the school, mostly because the laptops absolutely needed some access to electricity (although OLPC is working on a solution that relies solely on solar power or other forms of energy). It can thus be concluded that this select distribution currently feeds into the digital

divide. Likewise, countries already should have had some access to technology for a PC is needed to function as a server for the laptops. At present, this delivery method works against the idea of universal primary education, as those who do not have access to electricity cannot use the machine just yet. Nonetheless, the two countries analyzed stood at different stages of development: the Indian students had access to electricity and running water in the school (India/Khairat Chronicles, 2007); and the Nigerian students had no electricity nor running water in the school, relying on the neighboring houses to fully charge their laptops before they attended lessons (Nigeria/Galadima, 2007). Thus, the context in which laptops are being sent into currently encompasses two main factors: rural areas should have *some* access to modern technology and an education system that countries wish to improve must already be established. The combination of these two factors show that OLPC gives priority to countries that are already in the process of development[4], perhaps giving them the push they need to become self-sufficient.

The context in which the documents were written was also important to observe. First, all documents were only available on the wiki site of OLPC. Wiki's are developed for knowledge sharing and construction and enable anyone to edit the online documents. In the case of all these specific deployment documents, OLPC team members were the sole contributors. Their documents informed readers about their experiences in order for other countries to benefit from this shared knowledge. However, these documents were only accessible online. Therefore, countries must already have access to the Internet, again alienating those who do not have such

[4] The term *development* is controversial in itself. The discourse around the term was created by Western philosophy (Hendelman, 2003), which is why it can be argued that assuming that a country is developing means that it is modernizing, which begs the question as to whether development is inherently modernizing.

access, feeding into the digital divide[5]. This is mainly an issue because OLPC's mandate is to give access to education to every single child in the world, starting with the poorest.

While the documents seemed to intend to use a universal approach to the language used, meaning they seemed to be written in a way for anyone who is considering deployment to understand, a basic knowledge of technology and a basic education was still needed to understand the document. In fact, the Deployment Guide (2009) used terms such as "digitization," "website," and "local content repository" assuming that the reader understood what was written. Also, the same document presented a section on power and indicated how to calculate the power consumption needed for the school in which Watt calculation required basic math understanding. In this sense, OLPC assumes that some are already getting an education that allows them to read and comprehend the documents. Therefore, it can be asked whether technology is a necessity for the improvement of education in developing countries if some have already had the opportunity for a good education. Are countries starting to consider it necessary to leapfrog development through ICTs?

Moreover, it was observed that all documents were written using a positive approach and often reiterated the success of the program through the use of positive language such as "some key benefits," "this successful, on-going experience," and "it was excellent groundwork" while presenting no challenges or failures. The documents presented very little detail about the exact activities developed by each country and mostly described the positive interaction the students had with the laptop. This approach sets the tone in which the reader interprets the documents as

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[5] This concept can also be applied to the content produced by the local communities. Some produced digital libraries so that other students could benefit from the knowledge (Nigeria/Galadima, 2007). Although this helps in the empowerment of local knowledge, only those who have access to the Internet will be able to benefit from this knowledge, feeding into the digital divide and increasing social inequalities.

well as the deployments; it directs the reader into thinking that the XO laptop has had no failures during deployment and that no one will come across major challenges. This approach can only entice other countries to adopt the laptop without understanding the challenges and consequences that this inculcation can bring to the communities. Rogers (2003) was concerned with this issue as agents of change often omit discussion of why communities should not use a technology, a practice that was observed throughout the documents.

Diffusion of the XO Laptop

Rogers (2003) illustrated that the diffusion of innovation was described as (1) an innovation (2) that is communicated through certain channels (3) over time (4) among the members of a social system. Accordingly, the XO laptop is being diffused through the OLPC organization into developing countries to improve education in order to ultimately alleviate poverty. However, this diffusion method raises issues of inequality, as the distribution can be unequal. Actually, priority seems to be given to countries that are already somewhat developed and can afford to use the laptops in their schools. Both the Indian and Nigerian deployments showed that there was a possibility for support from both external and in-country donors who had the means to help support rural schools. Having said that, Nigeria could not continue with the program after its pilot trial because of lack of funding (Nigeria/Galadima, 2007). Unfortunately, diffusion is not possible without proper funding. On the other hand, it is also thought that using appropriate diffusion strategies can increase equality (Basu & Weil, 1998; Röling et al., 1976; Shingi & Mody, 1976). In any case, while laptops may be unequally distributed globally, giving priority to rural areas attempts an equal distribution.

As discussed in the literature review, the diffusion of innovations often abides to what Burniske (2003) described as *the chain of doing*. When people are not offered a choice, they are

forced into accepting a certain perception of the world that could steer them away from their traditional customs. After examining the deployment documents, it was observed that OLPC seemed to have found a balance between the restriction of technical functionalities and the free will of knowledge construction. Having said that, more elements factor into the chain of doing. Users are not offered a choice of software to translate their materials for example; Pootle is the only tool they can use. Thus, they are forced to use a tool, created under Western thought, to produce their materials. Consequently, communities change their perception of the world as Burniske described it. Also, OLPC offers teachers a way to deliver customized classes through an online system, namely Moodle. Actually, this is a tool used by University professors to deliver class notes in Universities, which I have personally used. Again, the use of Western tools feeds into a new perception of the world, designed by Western thought. This new perception is also constructed through the use of the operating system, which is limited to Sugar (the open source software installed on the machine) and specific software designed for a distinct purpose. For example, students are directed to use the Journal activity to record a history of their activity on the laptop. The documents do not suggest using this activity in a different way, which adheres to Burniske's chain of doing; people will accept the practice and thus adhere to the worldview. As Melkote (2003) stated,

> [B]y exposing individuals to new people, ideas, and attitudes through the mass media, they accelerated the process of modernization. People in the Third World could expand their empathy by exposure to the mass media had the potential of blowing the winds of modernization into isolated traditional communities and replacing the structure of life, values and behavior with ones seen in modern Western society. (p. 134)

On the other hand, the Deployment Guide (2009) insisted that local customs, beliefs and ways of doing should be incorporated in any implementation (something Rogers [2003] feared was not practiced by developing agents). In fact, freedom of incorporating these customs translates into the freedom to develop activities that are appropriate for the context. In India for example, a professor developed an activity around trees that incorporated Mahatma Gandhi's analogy of religion being like a tree (India/Khairat Chronicles, 2007). As a result, professors and students have the freedom to develop local activities that diverge from Western models (Educational Activity Guidelines, 2008). In fact, the Deployment Guide (2009) advised that, "the classroom is not limited to a pre-determined, one-size-fits-all approach" (p. 7). Therefore, because context is taken into consideration and activities can be adapted to people's needs, some issues of modernization can be disregarded seeing that a focus on the people is evident. Indeed, instructors are encouraged to make sure that the laptops work solely as mediators to establish a strong learning experience, an idea that echoes Burniske (2003) and Newhouse's (2002) concepts. Again in India, students were observed to be improving their abilities with the laptop, which in turn improved their learning experience. This adaptation makes cultural incompatibility obsolete because activities are designed according to the context. But as Ellul (1964) feared, would the focus eventually revert back to the machine?

Educational outcome. The laptop's diffusion appears to be contradictory. While OLPC advocates the incorporation of local customs, there are not a variety of ways to give the class besides choosing between the dominant paradigm (traditional schooling with passive receivers) and the alternative paradigm's (focused on participation, empowerment and knowledge construction) educational approach. Throughout the documents, it was observed that the alternative paradigm was advocated, representing OLPC's mandate based on the constructionist

theory and rooted in postmodernist thought. In fact, the laptop shelves traditional computer models in order to make space for this new approach (Deployment Guide, 2009). Still, basing this thought on Banerjee's (2009) beliefs, Western ideologies may have transferred along with the diffusion of the laptop through the constructionist theory, which stems from Western thought. In fact, because the documents were written from an OLPC team member's perspective (usually focusing on the educational side of the projects), it is a possibility that Western views could transfer into the students' education.

Themes

While Appendix C details the themes yielded from the document analysis, the themes described below were most prominent across all deployment documents.

Participatory approach. In every aspect of the deployment, both the Deployment Guide (2009) and the Educational Activity Guidelines (2008) insisted on participation from all stakeholders. Participation in activities was considered the principal pillar of learning. In practice, both India and Nigeria included all stakeholders in their deployments and activities fostered participation not only between students, but also between teachers, parents and the rest of the community. In fact, the Indian deployment pointed out that OLPC insisted on community involvement through the open concept of the laptop. Giving such access to the community could be beneficial for particular groups of people. For example, HIV/AIDS being one of the biggest challenges in the developing world (MDG Report, 2008; see also Keating, Meekers & Adewuyi, 2006), this access could be particularly helpful for mothers who would like to learn more about the disease and best health practices. In doing so, every member of the community was invited to participate in school activities. Likewise, the parents and siblings of the Indian students acquired knowledge from using the laptop at home. Essentially, this type of participation entices the

sharing of knowledge, a key element according to the Deployment Guide (2009). Moreover, it was observed in the Indian deployment that by teaching others, students reinforced their own knowledge. In fact, the Educational Activity Guidelines (2008) suggested that this exchange of ideas stimulated the students' critical thinking skills, which according to McGregor (2004) was one of the basic human needs Furthermore, in both India and Nigeria, OLPC's program has shown great improvement in school attendance because the students felt like education was more enjoyable with the tool.

Cooperation is one of the basic pillars of the constructionist theory; "Learning to learn" was applied in both communities. In Nigeria, teachers collaborated in order to improve educational activities within their classrooms. Likewise, in-country teams were willing to share their experience and material to other schools and professors in order to insure the enhancement of education. Indeed, OLPC is centered on the idea that sharing knowledge can only be in everyone's best interests (Deployment Guide, 2009). Essentially, all countries demonstrated a strong sense of collaboration and knowledge construction in both the learning environment and the deployment of the laptop. Indeed, the Educational Activity Guidelines (2008) recognized that each teacher brought new knowledge and experience to the OLPC project.

The participatory approach used by OLPC suggests the empowerment of local knowledge. In fact, participation in the translation of the materials – an issue discussed across all deployment documents – makes possible the expansion of local knowledge. However, McKeough et al. (2008) noted that language barriers could be problematic during knowledge transfer. As the authors suggested, language builds worldviews in which identity is inherent, which OLPC handles through region-adapted keyboards. As such, OLPC has made the empowerment of local knowledge possible. The participation of local translators compels the creation of local

knowledge developed within the local worldview. In fact, it was stated in the Deployment Guide (2009) that, "OLPC encourages translation as a community sport" (p. 3). The guide further explained that translations depended on the local team, meaning they did not need to be dependent upon external factors.

Along with community participation, OLPC encourages cooperation between the organization and the community. Indeed, the documents constantly suggested that OLPC welcomed feedback from users. This type of behavior gives a strong idea of what the organization would like to see translated as a practice within the communities.

Although this approach might be beneficial for OLPC's project, it can be argued that this new way of thinking is based on a Western model. Newhouse (2002) stated that the participatory approach constituted the modern way of learning. It appears that OLPC uses modern ways of learning in order to improve education in developing countries. As it was defined in the literature review, modernization is the diffusion of Western ideas for capital expansion, guiding countries towards a global vision (Bernstein, 1971; Ellul, 1964; Hendelman, 2003; Jacobson, 2004; Melkote, 2003; Tiejun, 2007). In the case of the XO laptop, because OLPC tries to apply a new vision of thinking about education globally with the aim of economic prosperity for poverty alleviation, it can be further argued that the organization is modernizing developing countries. However, it is important to note that OLPC does not seem to seek personal capital expansion, but instead seems to genuinely want to improve worldwide education for poverty alleviation. Still, as a universal concept, the participatory approach stems from Western thought and inquires about Gough's (2004) *West knows best* approach applied in this case. Indeed, as OLPC works to instill universal primary education through the participatory approach, it can be asked whether OLPC believes that their approach is the best and whether it implies that the West knows best. Actually,

in the Indian deployment, it was important for OLPC that the children, "discover the joy of working with the OLPC approach" (India/Khairat Chronicles, 2007, p. 8). Also, within the same deployment, OLPC took pride in teachers who transferred information to their students the same way it was transferred to them, suggesting modernization.

Localization. The main definition of localization is rooted in customization and highly related to context: being able to adapt the machine to the context in which it is introduced; more specifically, location-specific adaptation (Educational Activity Guidelines, 2008). Indeed, the Deployment Guide (2009) insisted that local customs and beliefs be incorporated into the implementation, which was an observation in the country deployments. For instance, the school in Khairat kept traditions as some brought coconut and incense to bless the hole in which the server was to be installed (India/Khairat Chronicles, 2007).

According to the Deployment Guide (2009), almost every aspect of the XO laptop can be localized and customized. It is important to note here the use of the term "almost" that insinuates that not everything is customizable. In fact, the Deployment Guide (2009) explained that the base software is only customizable to some extent and that, "some localization to fit local issues and cultures will be possible" (p. 8) regarding the education of the children itself. Thus, it can be assumed that some parts of the laptop have to be used the way they were intended to, limiting the user's choice.

Essentially, OLPC is replacing the traditional schooling system with a new system that can be applied around the world, making it universal, but stemming from Western thought. Although OLPC is trying to learn from its past mistakes, it still appears to be modernizing countries by giving them limited freedom. This practice adheres to Burniske's (2003) chain of doing. Indeed, the author explained that when a community is initiated to a subculture, one accepts the new

system of information and the new perception of the world. By restricting customization created by this subculture, the XO laptop complies with the chain of doing. Although the project seems to adhere to the alternative paradigm, it is still doing so within a specific framework towards a specific goal, which can be traced back to the dominant paradigm.

In any case, the documents showed that customization was done by an in-country team – comprising of local members of the community – put together to insure a clear knowledge of cultural implications. Following this, the XO laptop was adapted and deployed according to local policies. In fact, the in-country deployment teams were encouraged to understand and challenge local policies regarding ICTs in order to proceed with successful deployments (Deployment Guide, 2009). By supporting such an evaluation, OLPC hopes that communities will develop self-sufficiency and critical autonomy. Undeniably, OLPC believes that it is important for countries to understand the policies and regulations regarding ICTs in order to challenge them because it deems it fundamental for countries to consider the impact of technology on their own communities (2009). As such, OLPC shows once again the benefits of technology, but fails to discuss the negative impacts this introduction can have on the communities.

The in-country team is also encouraged to look into Internet policies, which are usually developed in collaboration with local authorities (Deployment Guide, 2009). Conversely, OLPC does not seem to be preoccupied with content filtering regarding the Internet. The Deployment Guide (2009) stated that, "[c]ontent filtering, *while of limited utility* [italics added], can protect children from exposure to harmful content" (p. 8). From this quote, OLPC seems to insinuate that content filtering is not important, while Albirini (2002) would not agree. The author argued that some are weary of technology because of the influence new content found on the Internet could have on their culture. This is an issue that OLPC lacked to discuss across all documents. In

spite of that, OLPC is willing to install filters if the country wishes to do so (Deployment Guide, 2009).

Much like a chameleon, the XO laptop retains its main features but changes its activities – updated on location by the in-country team – according to the context. Having said that, although the in-country team is responsible for the inclusion of activities on the laptop, they are to do so only beyond the core activities already installed on the laptop. In fact, in-country teams are introduced to the OLPC learning model before they develop their own activities (Deployment Guide, 2009). Once more, the community is given freedom within a specific framework, forcing them into the chain of doing as they forge a specific worldview.

Yet, OLPC acknowledged that its deployment team did not hold all the answers, as they were aware that in-country teams were more experienced and had more knowledge of the local context (Deployment Guide, 2009). Having local experts within deployment teams makes rural deployments easier because the circumstances of the milieu are better understood. In fact, the whole idea behind OLPC is based on knowledge construction, something that was observed in both India and Nigeria. This aspect was particularly specified in the Nigerian deployment by using phrases such as, "working on here means constructing" (Nigeria/Galadima, 2007, p. 1). Indeed, the Educational Activity Guidelines (2008) insisted on local knowledge construction for localization. Actually, most of that document showed signs of the necessity of this particular approach. For example, it insisted on composing music over downloading music, as well as emphasized the idea of learning by doing by, "constructing new knowledge for themselves" (p. 3).

Moreover, the Deployment Guide (2009) insisted on location-specific language-adapted keyboards for the local creation of materials. However, keyboards in both India and Nigeria were

constituted of English and the local language's alphabets, in which case English was also taught, which can show a domination of the English language over various parts of the world[6].

In addition, the educational side of deployments also exposed some modernization issues. While students were encouraged to apply their knowledge into situations that they understood based on their abilities, participants were to share their achievements with the XO laptop in the manner of a science fair (Deployment Guide, 2009). As such, it can be asked whether science fairs are part of the culture in which the XO laptop is introduced. In this sense, OLPC applies a Western way of presenting information to the community, assuming that it is the best way. Having said that, OLPC stated that teachers did not have to adhere to traditional models, as it was up to them to now innovate with the tool at hand (Educational Activity Guidelines, 2008). However, this can easily be questioned as they are given freedom within a specific framework, again implying modernization.

Localization can thus relate to issues of globalization. As OLPC adapts a universal concept to a local context, such adaptation leads to universal education, stemming from globalization, which is inherently a Western concept. While I cannot argue that Gunaratne's (2009) fear of universal universalism may be at hand because non-Western views are being considered, local culture in developing countries are still being positioned within a Western worldview.

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[6] The teaching of the English language in developing countries is controversial because language creates worldviews (McKeough et al., 2008). Learning a new language builds a new worldview, which in this case adheres to the dominant paradigm. However, it is important to recognize a country's colonial past, which translates into their present worldview. Having said that, OLPC seems to only adhere to the demands of the countries and does not force any content onto the communities (Deployment Guide, 2009; Educational Activity Guidelines, 2008; India/Khairat Chronicle, 2007; Nigeria/Galadima, 2007).

Empowerment. Within the documents analyzed, all activities showed traces of empowerment. The organization seems to define the term as children being able to learn on their own. It trusts that this sense of accomplishment will transfer into more confidence to keep working with the tool. Indeed, the Educational Activity Guidelines (2008) insisted that children should explore, experiment and express themselves with the new tool, empowering the content and providing children with this sense of accomplishment. Surely, this aspect was present in learning activities within both India and Nigeria (India/Khairat Chronicles, 2007; Nigeria/Galadima, 2007).

Likewise, it was observed in the Deployment Guide (2009) that in-country team workshops were created to empower deployment teams to help them establish the best learning environment. In fact, it is highly important for OLPC that in-country teams are capable of leading projects on their own, giving them the tools to insure long-term self-sufficiency and sustainability for the program within the schools (2009). At the same time, these workshops were described as, "a progressive deepening of understanding of the learning process" (2009, p. 6). Accordingly, the following question can be asked: what learning process is OLPC referring to? Certainly, it is not the traditional one, but the alternative one embedded within participation. As such, it stems from Western thought and is based on the specific model of constructionist theory. In fact, the India/Khairat Chronicle (2007) used terms like "Following the guidelines I gave them" and "I worked with the teacher on what Project-based learning is," which suggests that OLPC is forging a specific worldview while empowering people. Could it be argued then that empowerment and knowledge construction are directed toward a distinct vision that OLPC envisioned for these countries? Actually, the Deployment Guide (2009) claimed that OLPC hopes that students will come to the same conclusions as OLPC did about ICTs. By making such claims, OLPC assumes that they know the answer and thus implies that the West knows best. As

the members of the organization are people who firmly believe in their product, can they be trusted to provide enough information for people to make an informed decision about their choice of ICT?

As described by Lucy (2008) and his colleagues, empowerment is the capacity to make decisions and take control of a situation. Although OLPC attempts to apply this concept in its deployments, there are certain signs that show otherwise. While each country is responsible to train a deployment team (creating a sense of empowerment), OLPC guides them in their deployment process (Deployment Guide, 2009). Overall, the Deployment Guide (2009) proposes questions about the specifics of the deployment such as, "How will the laptops be shipped? How will inventory be managed once it is in country? What are the school selection criteria?" (2009, p. 2). As such, does OLPC assume that countries could not think of such questions on their own? It could be argued here that giving people directions hampers their freedom (Lavers, 2008; see also Makuwira, 2006), as the questions are posed within a specific framework. Likewise, this kind of limitation could be seen later in the same document not only when it is stated that only 1% of an order is shipped as overstock, but also when it is warned that these laptops should only be used for repair purposes. Could this be seen as a form of control? Does OLPC assume, again, that people would not know what to do with these extra laptops?

Nonetheless, OLPC views the country's training responsibilities as an important aspect from an educational point of view. In fact, the Educational Activity Guidelines (2008) insisted that, "the presence of other members of the learning community on each laptop will encourage children to take responsibility for their classmates as well as their own" (p. 2). Actually, the Nigeria deployment illustrated that it seemed to be more effective to have children helping children rather than listening to the teacher (Nigeria/Galadima, 2007).

Against such a backdrop, it can be disputed that self-sufficiency is rooted in the concept of empowerment. Thus, dependency can no longer exist once empowerment takes place because relying on external factors to survive is no longer a necessity. As previously stated, OLPC insures in-country decision-making for empowerment of both the local content and the people. On the other hand, the few limitations and assumptions about people's abilities during the deployment process hinder that empowerment. In fact, it can be argued that a stronger dependency on both the organization and the technology can result from the few restrictions.

Self-sufficiency. Across all documents, OLPC made it clear that self-sufficiency was an important goal that developing countries should reach. While OLPC provides support, the ultimate decision-making is always made in-country. Most updates and activations on the laptops are based on autonomous actions (Deployment Guide, 2009). In this sense, OLPC tries to combat dependency and encourages self-sufficiency.

That being said, while people depend on themselves for the content, they still depend on OLPC's operating system and translation tools – as they have no other tools at hand to produce content. This idea brings us back to Burniske's (2003) chain of doing. Users depend on the tools provided by OLPC and cannot deviate from their teaching model because it is embedded in OLPC's mandate. Even though both India and Nigeria were self-sufficient for the development of content for educational purposes, they still relied on external factors for the deployment process. In fact, not only did they depend on external donors for the provision of their PC (to use as the main server), but they also depended on external funding, such as Nigeria who has seized to receive laptops because of lack of funding[7]. Moreover, OLPC partnered with external

[7] This was not the case for India because the project constantly received funding from local NGOs or governments (India/Khairat Chronicles, 2007).

organizations (Global Forwarding and UNDP) for the distribution of their laptops (Deployment Guide, 2009).

Conversely, countries have agreed to use these laptops because they seek out to OLPC rather than the other way around. By doing so, they adhere to the technology and its ideology. In which case it can be asked whether the XO laptop falls into the *West knows best* ideology? Again, the nature of the documents presenting the deployment and the educational activities had a positive tone and were written by OLPC members (as mentioned at the beginning of this chapter) and thus may give a false image of the reality of deployments.

Analysis of Online Discussions through Mailing Lists

The analysis of online discussions through mailing lists revealed aspects of OLPC that were not present in the deployment documents along with strong similarities. As such, this particular analysis complements the document analysis. Although the information available was not proportional from both countries (India having four times as much information as Nigeria), similar themes were discerned nonetheless. However, because Nigeria had less information, it speaks to the lack of OLPC activity in that country. Indeed, there hasn't been any activity on the mailing list for over a year (apart from the general OLPC updates), suggesting that the project is on hiatus, as it was observed in their deployment (because of lack of funding) (Nigeria/Galadima, 2007).

While the document analysis depicted OLPC as being open about its endeavors and welcomed positive criticism, the analysis of online discussions through mailing lists demonstrated otherwise through similarities between India and Nigeria, as well as through distinctions within each country. As a matter of fact, India showed stronger debates about usability, deployments

and the necessity of the XO laptop while Nigeria discussed technicalities and issues of open source.

Context

It was observed in both documents that the discussions occurred between OLPC members and members of the communities (volunteers or people who wanted to participate in the OLPC project). Although the greater part of the dialogues was very technical, some themes were still uncovered. The participatory approach, localization, and self-sufficiency strategies could be depicted whilst revealing issues of modernization and issues of open source. Each of these themes presented an angle of OLPC that came to complement the document analysis or revealed information that was not previously identified. The online discussions exposed many debates that OLPC failed to disclose in their deployment documents.

Themes

While Appendix D details the themes yielded from the analysis of online discussions through mailing lists, the following themes were the most prominent across both documents.

Participatory approach. In both India and Nigeria, volunteer opinion was valued by OLPC. Although some volunteer entries were unanswered, OLPC still welcomed suggestions and opinions about the project. In Nigeria for example, following a technical discussion about a translation file that was missing, an OLPC member invited the community to start working on the translation after the file was created (Nigeria-opensource, 2006-2008). This example demonstrates the effort that OLPC makes to listen to the community's needs and provide them with the corresponding assistance. In this sense, people can feel the effects of their participation in the project, empowering them and their knowledge. In India, the same type of participation was noticed. Many of the entries brought out suggestions on how to improve the project or the

laptop itself (OLPC-India, 2006-2008). One particular entry depicted a series of pre-planned questions developed specifically for the Indian context by OLPC, which presented answers contributed by a volunteer (OLPC-India, 2006-2008). The questions used terms such as "what type of software do you suggest" and "what are the different types of Open Source software used in India" (OLPC-India, 20062-2008). As such, OLPC makes use of the knowledge shared by a community who knows best about its own context.

Despite this responsive approach, it was particularly observed in India that OLPC's answers were always very diplomatic and often failed to discuss roadblocks. OLPC was always trying to find reasons, excuses or explanations regarding the issues that came up, while never admitting or hinting that they might be wrong. For example, OLPC replied to a user complaining about OLPC's lack of cooperation to start a project in their school with diplomatic responses such as "we will be glad if you could also suggest us ideas about ways to improve" and "[member's] views/feedback are highly essential for us, and we value them with utmost regards" (OLPC-India, 2006-2008). From this, it can be assumed that: (1) through OLPC's diplomatic answers a good image of the XO laptop is trying to be maintained; (2) people are given the impression that they are indeed participating in the project - it is all about perception; and most importantly (3) OLPC believes that there is nothing wrong about their project, which adheres to Gough's (2004) *West knows best* notion.

Localization. Localization was a highly debated subject for the communities of both India and Nigeria. Indeed, volunteers found it imperative that localization be taken seriously during implementation. This was mostly expressed through their strong feeling about the necessity for translation gadgets. An Indian volunteer strongly believed that the content should be localized and developed locally making translation tools a necessity (OLPC-India, 2006-2008). Through

this process, empowerment of local knowledge would be achieved. Furthermore, some volunteers believed that developing local content and using local products would change the Indian government's mind about the project, which felt that the XO laptop was not a necessity at the time for the education of their children, but that desks, teachers and a better infrastructure were a higher priority (2006-2008).

The dialogues clearly illustrated the contextual side of localization during deployments. In India, a volunteer felt the need to emphasize that, "the most basic feature of Indian community is that it is very diverse. So this thing should be kept in mind while developing OLPC project" (OLPC-India, 2006-2008). Indeed, this is something that Rogers (2003) feared would be overlooked during the diffusion of innovation process. Still, while OLPC made a point to take context into consideration by valuing suggestions about the vision of India, they seemed to take a very universal approach to the project, which volunteers have noticed (OLPC-India, 2006-2008). Indeed, a blogger reflected this thought by comparing India to the European Union's states and how each individual state needed to be given attention from its unique perspective. This inaccuracy displays OLPC's difficulty to apply a universal initiative to a local context.

The debates also brought up issues with Internet content. Some people felt that there was a higher risk for children to be exposed to adult content while using their laptops at home. At school, professors provided a certain supervision insuring that students were using the laptops reasonably.

Another feature that India took strongly at heart was the text-to-speech feature, which would allow people to read in case of an electricity shortage or for illiterates to still have access to information. Although this innovation seemed to be considered by OLPC, the organization immediately advised that such a venture would require too much work for all current languages

used with the XO laptop. Instead, it suggested using the already established English text-to-speech feature. Still, if OLPC considered culture and context to be important as well as volunteer feedback, one would think that OLPC would take the time to create the feature because people felt it could improve the educational outcome of both their students and the community as a whole. In this sense, the true intentions of the organization could be challenged. Indeed, other volunteers felt the same as they saw issues with the diffusion. For example, both countries have complained that computers could not be ordered individually, but only in bulk through the government, with OLPC's reasoning that buying individual laptops would reduce the effectiveness of the laptops. This type of behavior by OLPC could be underlined with some issues of modernization and government control, adhering to the dominant paradigm.

Clearly, adapting a universal initiative to a local context has proven to be more challenging then originally anticipated because every location has specific requirements. A recurrent India mailing list participant believed that it was hard to change people's views about certain societal aspects, as a lot of local thinking was different from OLPC's vision (OLPC-India, 2006-2008). This blogger gave the example of bringing the laptop back home – as originally intended – something the communities could not conceive as acceptable because they feared cases of theft. Another regular blogger further suggested that many of the families would gladly resell the laptop in order to buy supplies for their families.

Nonetheless, it is important to note that their goal of adapting the same technology everywhere seems to be working. Indeed, the same technology was applied in both India and Nigeria and, to its best attempt, adapted to each culture's demands.

Self-sufficiency. Some issues of dependency were observed specifically within the Indian community. The first aspect that was greatly discussed involved the dependency to the

technology. For example, one blogger's suggestions proposed encouraging the children to use their laptops as a source of news. However, as stated in the literature review, using technology as a primary source of information could result in dependence toward the technology (Ball-Rokeach & Defleur, 1976; Jan, 2009; Melesse & Morales-Gomez, 1998). In fact, the same blog post later stated that, "the best thing that this laptop will do is decrease the dependence of people on closed source software, and groom up children in open-source environment from early childhood" (OLPC-India, 2006-2008). Another blogger echoed this logic by comparing the use of closed software to an addictive drug. Conversely, will using open source software insure that this addiction will not be present?

The second aspect of the dependency appeared to be concerned with funding, particularly from foreign investments and the Give One Get One (G1G1) program[8]. Actually, schools currently rely upon governments to purchase the now expensive laptops or rely on donations from abroad, which may not be a luxury for some schools. In fact, it has already been established that Nigeria interrupted the project because of lack of funding (Nigeria/Galadima, 2007). Furthermore, the online discussions demonstrated that schools can rely on local or foreign corporations to support the program as part of their corporate social responsibility initiatives (Nigeria-opensource, 2006-2008; OLPC-India, 2006-2008), which is questionable in itself: Are corporations supporting the program as a form of marketing for their own commercial endeavors? Yet, does it matter if it helps provide an educational tool for children who need it? Against such a backdrop, ethical issues may be raised regarding this behavior.

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[8] This program is designed for developed countries to sponsor developing countries. Each laptop purchased by a developed country's government is matched and deployed in a developing country. As the number of laptops around the world increases exponentially in the hands of the students, the laptop becomes virtually free of charge for developing countries (OLPC, 2009, Ways to give section).

Digital divide. In both online discussions, the diffusion of the XO laptop presented traces of a digital divide; a recurrent theme throughout most of the entries. A Nigerian father felt this inequality in consequence of OLPC's bulk order policy (Nigeria-opensource, 2006-2008). As a result, it can be assumed that OLPC currently feeds into the digital divide by offering laptops only to those who are lucky enough to have their schools chosen. Consequently, the organization is alienating people willing to pay for the laptop, something a frequent blogger in India also complained about. On the other hand, it can be presumed that OLPC is dedicated to their educational vision and is not looking to simply diffuse technology. On the contrary, the organization seems devoted to its mission and believes that it can only be delivered effectively through organized management.

However, as previously mentioned, this type of implementation is not widely accepted within both studied communities. Indeed, while OLPC strives to implement equality through the G1G1 program, this process further increases the digital divide. An OLPC member's post stated that, "the initial beneficiaries of the G1G1 program will be the countries where Government have agreed to deploy OLPC in their respective states, and are looking for some support, due to lack of sufficient funds" (OLPC-India, 2006-2008). Essentially, OLPC has thus far led us to believe that those who lack sufficient funds are the ones who would need the most support. Despite such thought, laptops are exclusively deployed through governments and corporations that can afford them. If countries do not have enough funds for computers and need to resort to the G1G1 program, it could be assumed that they barely have sufficient funds for essential goods. As such, should money be redistributed to provide bare essentials for those who need them? With the increased prices of the laptops (OLPC-India, 2006-2008), it will be harder for those who need support to receive the laptops because even though the laptops can be provided through the

G1G1 program, connection to the Internet, technical support and training are added costs that in-country deployment teams need to take into account.

Although OLPC may believe that extensive computer training is not necessary to properly use the laptop, one particular blogger thought otherwise. Indeed, this blogger found it imperative that users get proper training prior to using the laptop because some of them may have never seen a computer in their lives (OLPC-India, 2006-2008). As a result, those who cannot afford the laptop cannot take advantage of its benefits, maintaining or even increasing the digital divide.

Contrastingly, the implementation of the XO laptop's technology also works to reduce and possibly close the digital divide, as it is important to keep in mind the ultimate intention of OLPC – that is to achieve universal primary education across the globe for poverty alleviation. In fact, an Indian OLPC member pointed out that, "with the vision of OLPC [they] intend to take this to all the rural parts of the nation thus bridging the digital divide and such a [sic] initiative takes a while for the system to be in place for it to be successfully deployed across the nation" (OLPC-India, 2006-2008).

The online discussions further brought about the issues of using solar power to energize the laptop. As electricity and the lack thereof was recognized to be a big challenge in both regions analyzed (although this problem is in the process of being resolved in India), OLPC is currently conducting research on alternative energies such as old car batteries and human energy to support the XO laptop. Therefore, it can be understood that OLPC is trying to accommodate developing countries through alternative energies in order to provide developing countries with the best educational device possible, bringing them closer to closing the digital divide. The question still remains as to whether it truly is for humanitarian purposes or if they have been able

to hide a commercial endeavor under one of the most humanitarian technological projects of the century.

After a thorough analysis of the themes, the following deriving issues were observed.

Open source. As a core characteristic of the XO laptop, the online discussions through mailing lists highlighted the issues not only behind the technicality of open source, but also issues with OLPC's sometimes nominal reactions to the posts. In point of fact, Nigeria had trouble with OLPC's unresponsive attitude, with a quarter of the posts left unanswered (Nigeria-opensource, 2006-2008). Indeed, one particular blogger asked about future Nigerian rollouts as the blogger could not find any information about the subject, only to receive no feedback from OLPC (2006-2008). This example leads to the assumption that OLPC does not want to take the time to reply to all their volunteers, has no good answer to give the blogger, or wishes for the answers to remain secret. Either way, this raises questions about their open source policy. As the organization prouds itself to be open about its project (Appleyard, 2008; Deployment Guide, 2009), its lack of answer interrogates the true motive of OLPC and suggests a hidden agenda or a desire to stay in control. However, wanting control may imply that they know best because it suggests that people are inadequate to handle the laptops on their own.

In fact, it was proven a few times throughout both mailing lists that OLPC was only open about the positive accomplishments and often failed to discuss roadblocks. In this sense, it can be assumed that OLPC acquires new users by only presenting positive aspects of the project. As such, how can an informed decision be made about the use of the XO laptop if information is only one-sided? Again, this questions OLPC's motives in the diffusion of this innovation. Is it actually a commercial endeavor sugarcoated with talks of humanitarianism?

Modernization. Between the various themes previously described, modernization comes to bind the themes together. As such, this study was concerned with two different perspectives that

modernization took during implementation. The first one looked at the technology itself and the second one looked at its implementation within the countries.

Modernization from a technological point of view. This aspect was particularly observed in Nigeria. Indeed, a blogger questioned the use of Roman characters on the keyboard instead of the usual Arabic characters (Nigeria-opensource, 2006-2008). At first glance, one could be led to believe that OLPC was pursuing a modernizing agenda by changing an important aspect of culture: language. In OLPC's reply however, it was obvious that the colonial past was important to take into consideration, as previously mentioned in the literature review. According to a translator, Roman characters became more common and accepted after the colonial era, at which time Hausa – the local language – was previously written in Arabic. Subsequently, previous colonization is an important element to consider when studying the implementation of new technologies because new processes may sometimes be mistaken for a new form of colonialism. In this case, the community felt it more adequate to use Roman characters and it was not imposed by OLPC. At the same time, bending to a colonial past and adapting new technologies to such ideologies may appear as colonialism in disguise.

This situation was mirrored in India where a professor questioned a version of the keyboard that may have confused students because it did not use the traditional alphabet used in the classroom (OLPC-India, 2006-2008). OLPC presented a rebuttal with two versions of the keyboard and asked the community which one they thought would better serve the schools. Therefore, OLPC seemed to manage to suppress talks of modernization by using participation, empowerment and self-sufficiency as strategies. As it considers people's suggestions and more often than not implements the recommendations, the organization tries to institute the alternative paradigm's participatory approach.

Regardless of OLPC's seemingly perfect intentions, the Indian government was still weary of the technology and the effect it could have on the youth of its country. An Indian mailing list entry provided an article in which the Education Secretary of India, Sudeep Banerjee, believed that introducing a computer into children's lives could be detrimental to their learning capabilities and thus questioned the necessity of the laptop (OLPC-India, 2006-2008)[9]. The government of India argued that if money was available to spend on such an endeavor, then that money should be directed towards the universalization of secondary education, again questioning the necessity of the laptop within their country, a feeling echoed by Nigeria's Education Minister (2006-2008).

Clearly, the cost of the laptop is a burden on developing countries, something that OLPC was trying to avoid through their G1G1 program[10]. In this sense, their idea of universalization of primary education is currently unattainable as they were trying to implement it virtually free of charge for countries that could not afford it. Not only that, but because of the low demand of laptops, the unit price has increased, making it harder for developing countries to acquire the laptop.

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[9] Another blogger completely advised against the use of the laptop in India because of a scientific research conducted by his company, which resulted in children developing finger deformities from using computers before their bones were fully calcified. This comes to question whether the use of technology will eventually trump over health issues.

[10] Actually, an entry in the Indian mailing list argued that the G1G1 program was considered to be a joke for the Indian people as it was perceived as a big marketing scheme and thought it portrayed the XO laptop as a toy for rich countries (OLPC-India, 2006-2008). Indeed, one of the regular bloggers stated that it was all about perception and that the market was driven by this concept. The current perception of the laptop by the Indian people is not a good one because it is differs from what children in other countries are using and its low cost creates an image of the computer as a cheap piece of machinery. This comes to question the whole concept of OLPC. Why are children in developing countries not recognized as equally apt to use the same technology as children in developed countries do? Does this new approach come to demean the potential of children in developing countries? Is the West implying that it knows best?

Moreover, the already discussed example of theft manifested considerable traces of modernization. That example marks OLPC's relentless efforts to change people's worldview to adapt it to its own. It thus raises the question whether OLPC is in this sense modernizing. Although the technology is not forced upon communities, it can still be argued that those who are adhering to the technology want to see change toward a modern way of life. Therefore, Rogers (2003) would describe this group as early adopters of the technology, who are expected to later change the minds of those who are reluctant to use it (late adopters) to help them eventually accept the technology as a positive change in their lives. In fact, OLPC, "expects lots of positive and exciting news reports from the early adoption countries" (OLPC-India, 2006-2008). Therefore, while it may not be the organization's intention, OLPC is slowly and subtly modernizing developing countries through the diffusion of the XO laptop towards the ultimate goal of economic prosperity.

An issue that will only be briefly discussed but should not go unnoticed is the introduction of Windows onto the laptops. There was much debate about Windows and Intel being against OLPC and how they tried to create roadblocks for the non-profit organization (Appleyard, 2008). In the end, it was simpler for the Microsoft Corporation to simply join the project rather than fight what had become competition. In an article posted in the Indian mailing list, it was stated that with Linux running on the laptops, Windows was losing exposure (OLPC-India, 2006-2008). Therefore, for economic reasons, Microsoft decided to join the humanitarian endeavor. When Microsoft – who holds the biggest share of monopoly on software technology – joined the project, a few people advanced their concerns about this alliance (Appleyard, 2008). Mainly, this partnership fostered anger among advocates of the project because the concept of open source could no longer apply (which goes against OLPC's mandate).

Modernization from an implementation point of view. Regarding implementation, a blogger felt the need to point out that, "things just work among the chaos than of organized governmental control" (OLPC-India, 2006-2008). As previously stated, OLPC feels that it is important to deploy the laptop in an organized fashion and, because it is currently only possible to order the laptops through the government, it can be assumed that OLPC seems to create some form of world order that puts government in control of this technology. In that case, it can be further assumed that, in situations in which governments are corrupted, people may not experience the benefits of the XO laptop, or conversely may be forced to use this technology through government control. Therefore, this type of process not only hinders people's freedom and forces them into Burniske's (2003) chain of doing, but it also has the potential to increase the digital divide. Concurrently, OLPC believes that if any citizen could purchase the laptop, then the rich would take precedence over the poor, while the poor are those in most need of an education. This is why OLPC trusts in the importance of some form of control to make sure that those who need it most will primarily benefit from the educational advantages of the laptop. A blogger in India put it well by acknowledging that if, "they start selling without any control, the [very expensive schools in the city] would be equipped fast discrediting the project" (OLPC-India, 2006-2008).

In spite of that, the community does not accept this form of control. Two bloggers in India expressed their anger concerning this process (OLPC-India, 2006-2008). One of them believed that OLPC had a hidden agenda while the other felt like the program prevented NGOs from participating, which gave him reason to lean on another computer technology similar to the XO laptop. This inevitably creates competition, which in turn could eventually culminate into an economic endeavor, leaving the humanitarian side of the project behind.

Summary of Chapter

This chapter looked at the results of the document analysis and the analysis of online discussions through mailing lists. From this analysis, the themes on which OLPC based its initial strategies and mission were revealed. Indeed, the document analysis yielded participation, localization, empowerment, self-sufficiency, and digital divide discussions, while the online discussions were mostly concerned with participation, localization, self-sufficiency, digital divide, and environmental debates. The thematic analysis of both sets of documents revealed that tenets of modernization were at the root of OLPC's open source and diffusion strategies. Examining each theme individually permitted a thorough understanding of each underlying strategy used by OLPC in the diffusion of the XO laptop in developing countries.

Following the analysis of the results, the next chapter attempts to answer the three main research questions by discussing each question individually.

Chapter 5: Discussion

After a thorough analysis of the various themes identified in both the deployment documents and the online discussions through the mailing lists, this chapter attempts to answer the main research questions based on the analysis conducted in the previous chapter. To reiterate, the three main research questions posed were:

RQ 1: What were OLPC's initial strategies in the diffusion of the XO laptop? Do these strategies reflect an attempt to help close the digital divide between developed and developing countries?

RQ 2: Does the XO laptop act as a catalyst for the positive transformation of societies in developing countries?

RQ 3: Toward what vision is the reconstruction of knowledge directed through the use of the XO laptop?

This chapter also puts forward concluding remarks about OLPC's initial strategies and tries to understand the tension between modernization and the diffusion of the XO laptop. Through the results of the research, the discussion provides a firm understanding of OLPC's initial strategies in order to clarify the picture of diffusion of new technologies in developing countries. Mainly, three themes were similar across both the document analysis and the analysis of online discussions through mailing lists and transpired into the initial strategies used by OLPC: participation, localization, and self-sufficiency, which in turn showed traces of modernization. Other themes such as empowerment and the digital divide were present in both analyses but were not as prominent. Answering the first question, which precisely asked about those strategies and whether they reflected an attempt to close the digital divide, will help answer the following two questions, which derive from the first one.

Discussion of Research Question 1

This first research question should be addressed in two parts, as the second component is answered through the first one. Indeed, OLPC's attempt to close the digital divide is reflected in its diffusion strategies (see Figure E2 for a visual representation of the central theories that relate to this question).

To recapitulate, it was observed in the Results and Analysis chapter that OLPC painfully applied a universal concept to a local context. Indeed, the local context in both countries was fundamental to consider and results showed that applying the same concept in both regions was not entirely for the best interest of the students because each machine required a region-specific adaptation. That said, the same technology was applied in both regions and adapted to each culture's demands. Thus, as the literature review asked whether Western initiatives, such as the MDGs, should be redefined to accommodate local culture rather than using universal models, I would say undoubtedly so. Still, Banerjee (2009) and Gough (2004) maintained that universal initiatives (such as the XO laptop) often took Western traits, even though it may not be the intention of developing projects. As both authors would agree, OLPC's initiative implies that the West knows best, simply because it takes a universal approach and applies it to a local context through the transfer of Western ideologies. Actually, McGregor (2004) argued that satisfying needs within a universal framework was part of a Western discourse.

The Strategies

Participation. Looking at the general participation to the project by the community and the participation that the project fosters illustrate perspectives in which this theme was used as a strategy. Both the document and the online discussions through mailing lists analyses demonstrated participation in the project.

In order to promote participation, OLPC used techniques of positive thinking. Indeed, all analyzed texts portrayed a very positive approach towards the XO laptop project. Keeping things positive positions the XO laptop in a good light and thus reassures people about the project. While some governments were shown to prefer spending their money on secondary education or a stronger infrastructure (Nigeria-opensource, 2006-2008; OLPC-India, 2006-2008), gathering exclusively positive information about a product entices people to acquire it without making a fully informed decision, rendering it commercially inclined rather than humanitarian. In doing so, OLPC failed to acknowledge or discuss failures and roadblocks, although bloggers plainly pointed them out (Nigeria-opensource, 2006-2008; OLPC-India, 2006-2008). It is important to note that volunteers clearly stated that many were weary of the technology. As seen in the literature review, Burniske (2003) expressed Rogers' concern about developers using such methods because it forced communities into the chain of doing. Surely, OLPC chooses to transfer a certain worldview to developing countries, which can be easy to acknowledge if only positive remarks are being said about the project and the prosperity it promises.

In addition, the installation of Windows on the computers at the end of 2008 also works as a tactic to gain more participants in the project. As previously stated, the partnership with Microsoft is not the intent of this research but it still poses future questions about the spread of the XO laptop as the best model for education, charging them guilty of modernization through a *West knows best* approach, as indicated by Gough (2004) and McGregor (2004). While OLPC does not explicitly show signs of personal capital expansion, the installation of the software on the machine may entice more people to acquire the machine because it is the main software used in the developed world. In this sense, people may feel more empowered because they have

access to knowledge that will permit them to strive in the global economy, adhering to the dominant paradigm in which this software operates.

Fostering participation within the school and the community as a whole through the XO laptop has been a successful effort in both regions analyzed, as users felt compelled to use the machine to acquire information and subsequently gain confidence (India/Khairat Chronicles, 2007; Nigeria/Galadima, 2007). As many authors base participation on knowledge transfer within a society (Bezanson & Sagasti, 1995; Davidson et. al, 2000; Jacobson, 2004; Prévost, 2004), OLPC has found an innovative way to apply this strategy within its project. As the deployment guide advised, both countries showed a strong sense of collaboration across all documents, which stimulated local empowerment through the use of the laptop. This awareness developed because not only were people given a lot of responsibilities towards the laptop, but students were also assigned group projects that often involved the community (India/Khairat Chronicles, 2007; OLPC-India, 2006-2008; Nigeria/Galadima, 2007; Nigeria-opensource, 2006-2008). Similar to other ICT projects, which gave people a sense of confidence (Dlodlo & Beyers, 2009; Gatua, 2007), this rapport gave children and members of the community a sense of achievement that built their confidence, consequently empowering them. As such, the XO laptop helped increase school attendance because children felt greater joy learning with the laptop. Consequently, if such a successful experience can be reproduced elsewhere, then the percentage of children who complete their primary education should increase.

Furthermore, it was very clear throughout all documents that translation and the production of local content were very important for both Indian and Nigerian community members. By providing such avenues for the construction of local knowledge, OLPC's strategy gives power to locals, promoting empowerment. Yet this promotion is done through OLPC's teaching model,

which may guide people towards an idea of power manufactured by Western ideals. Therefore, empowerment seems to be gained by the organization leapfrogging development through a vision that is arguably modernizing (see also Banerjee, 2009).

Likewise, Newhouse (2002) pointed out that participation was the new modern way of learning. As such, it can be argued that while OLPC attempts to implement the alternative paradigm (Melkote, 2003), it also raises issues of modernization, as OLPC firmly believes that its model will revolutionize education (OLPC, 2009), steering it away from traditional education. Indeed, this alternative paradigm stems from Western thought and thus Western ideologies may have transferred along the way (Banerjee, 2009). Most important, some people have contradicted this approach, as they believed that the traditional school system was more appropriate (Papen, 2005). In this sense, trying to change people's worldview could be considered modernizing as traditional cultures transform into modern cultures that share Western ideas (Bernstein, 1971; Ball-Rokeach & Defleur, 1976; Ludlow et al., 2008).

Localization. Context and content make up the two pillars on which the second strategy is based. It was essential for OLPC to respond to people's needs within the educational sector during the diffusion of the XO laptop, thus satisfying people's demands for appropriate context (Tharp & Dalton, 2007). As a result, some issues of modernization can be disregarded because context is being considered and there is a focus on the people, characteristics that the concept of modernization lacks (Bernstein, 1971; Hendelman, 2003; Jacobson, 2004; Melkote, 2003). Nevertheless, the question still remains as to whether educational infrastructures of developing countries hold the best setting for the laptop. To reiterate, a few bloggers in the mailing lists manifested their disdain towards the project because they believed that their country primarily needed basic infrastructures or that focus should be taken away from primary education and

transferred to secondary education (OLPC-India, 2006-2008; Nigeria-opensource, 2006-2008). If there is no good infrastructure in place for primary education, the laptop may not be the right step for their education; therein lies the digital divide discussed later in this chapter.

Moreover, while local customs and beliefs are respected during implementation, OLPC replaces the traditional school system with a new setup that gives limited freedom through hardware and software, initiating people into the OLPC subculture, characterized by a new perception of the world. This strategy adheres to Burniske's (2003) chain of doing. It attempts to change people's view about both technology and education and this attempt is precisely what modernization has been criticized for because local culture was being replaced by Western ideals. However, can this technology be disregarded if it has proven to increase school attendance?

Against such a backdrop, it appears that OLPC does not deliberately modernize because context is valued in their deployments. On the other hand, it tries to adapt a universal model of education by changing a culture's preconceived notions of the world, which may drive people into the chain of doing (Burniske, 2003).

Self-sufficiency. By providing people with the power to control the software and activities on the laptop, albeit within a specific framework, OLPC aims for the self-sufficiency of societies and hopes for the development of people's critical autonomy, one of the basic needs described by McGregor (2004). However, while India and Nigeria depended on their own people for the development of content for educational purposes, they still relied on external factors for the deployment (they depended on OLPC for the software and on external donors for the laptops themselves). Certainly, this rapport between users and external agencies denotes Gunder Frank's (1967) idea that industrialized countries dominate in a core-periphery configuration (as discussed

in Dicken, 2007). In this system, developed countries hold the upper hand and somewhat control the diffusion of the XO laptop. Apparently, OLPC asserts this control by limiting the number of extra laptops sent into a country, as depicted in the Deployment Guide (2009).

Furthermore, in-country teams are introduced to OLPC's learning model before they can develop their own activities. This method supposes that teachers are incompetent to teach within the alternative paradigm and that the organization knows how to apply the concepts related to that paradigm because they believe to have developed the techniques[11]. As Lavers (2008) postulated, those who intervene within communities insinuate that people cannot make their own decisions, which restricts their freedom (see also McGregor, 2004). In this sense, if I argue that freedom hinders self-sufficiency, and thus empowerment, then OLPC restricts empowerment when it feels compelled to give people guidelines about using the laptop (Deployment Guide, 2009). However, is there another choice? How will people know how to improve their own education system – which is an issue that developing countries want resolved – if they are not exposed to new ideas? Problems of dependency on OLPC may result from this restriction because of the organization's assumptions of people's capabilities.

Having said that, the second part of the question can be answered, which asks whether OLPC's strategies reflect an attempt to close the digital divide between developed and developing countries.

At first glance, OLPC does attempt to close the digital divide by giving priority to those who cannot afford the laptops and need it most over those who can afford them, or already have a solid technological or educational infrastructure. However, the selection of the schools becomes problematic. Indeed, the selected schools are only those for which governments have agreed to

[11] Actually, this was not the case as Van de Fliert and Do Thi Minh (2009) iterated that Vietnam was already aware of these techniques in the '90s.

deploy the laptop, giving priority to governments that can afford it. Therefore, this select distribution feeds into the digital divide because some countries are given priority. Also, because countries need to already have access to electricity (under whatever form), should already have an education system to improve on, and should already have some access to technology, communities that do not have this specific infrastructure in place unfortunately lag behind because deployment is too costly. Under the circumstances, it appears that the XO laptop is presented as a tool that can help societies achieve economic prosperity and thus poverty alleviation, but only for those who can afford it, making it inherently modernizing (Melkote, 2003).

Indeed, priority is given to those who need it most within the group of those who can afford it mostly because the diffusion of the laptop is not possible without proper funding. Still, the necessity of the laptop can be questioned for countries that cannot afford it and whether money should be directed otherwise.

Although OLPC's way of doing may seem alienating, it's organized methods' purpose is to create an effective learning environment while attempting to decrease the digital divide. Likewise, OLPC's G1G1 program helps close the digital divide, as it is developed for those who cannot afford it yet have the possibility to rely on external sources to provide them with the educational tool. While it is still too expensive for all developing countries to afford, OLPC hopes that more countries will enroll into the program, reducing the unit price of the laptop, allowing access to a greater number of people.

Discussion of Research Question 2

After reviewing the first question, the second question – which asked whether the XO laptop acted as a catalyst for the positive transformation of developing countries – can be answered both

positively and negatively because the term *positive* is relative (see Figure E3 for a visual representation of the central theories that relate to this question).

As such, the following question can be asked: According to whose standards is this transformation positive? For example, because of a colonial past, some communities may feel it empowering to live up to the *modern man*'s ideals, represented by Papen's (2005) example of the people of Durban who viewed traditional education as a way to claim an elite status. In that case, basing myself on the results of Papen's study, the XO laptop does act as a catalyst for the positive transformation of societies in developing countries.

Although OLPC may have the aforementioned effect on developing countries, such action can produce both positive and negative effects. If a positive transformation is recognized as fulfilling basic needs and providing people with more comfortable lives – which is assumed to be the intention of development - then the laptop does act as a catalyst for the positive transformation of developing countries. In fact, the organization has been able to leapfrog development (Davidson et al., 2000) through the installation of the laptop, resulting in more children attending school, which was one of the targets of the MDGs (MDG Report, 2008). Although it cannot be fully discerned in the period of time the documents were analyzed, I want to highlight the point that OLPC is on the right track to transform communities positively. From a developer's perspective, the XO laptop offers the eventual possibility of fulfilling basic needs, which is a positive change considering their basic needs could not previously be met.

On the other hand, the following question remains: Are countries willing to change their worldview in order to adhere to the alternative paradigm, which involves ICTs? The future benefits of the XO laptop do not go unnoticed, but some remain weary of the effects the technology can have on their culture and society. As seen in Albirini (2006) as well as in the

online discussions, people still fear the eradication of their culture with the venue of ICTs. While adhering to the alternative paradigm positions countries away from the traditional (previously colonial), this model still features some principles of modernization and dependency that countries may not want to face.

In order to reach its goals, OLPC seems to need to replace traditional worldviews with a modern worldview. Consequently, the introduction of this ICT can be perceived as both a new form of colonialism (Bernstein, 1971, Ellul, 1964; Hutson, 2008; Jacobson, 2004; Sidel, 1993) and a new link in the chain of doing (Burniske, 2003). Considering that OLPC may thus adhere to cultural imperialism (Gatua, 2007; Jan, 2009), the XO laptop could act as a catalyst for the negative transformation of societies because it seems to apply colonialism in a more subtle way although not necessarily intended. Postmodern theory was precisely developed to avoid such modernizing activities, as shown in Musa's (2009) example of indigenous media. While the XO laptop may eventually fulfill basic needs, it also introduces dependency on the new media, producing a new need.

The strategies applied through participation, localization and self-sufficiency depict a positive picture of the possibilities that the XO laptop can offer, making it easier to diffuse and adopt. However, an informed decision cannot be made about the adoption of the laptop with such persuasion.

The Strategies

Participation. Through positive thinking and its partnership with Microsoft, OLPC has been able to foster participation to the XO laptop project. The adoption followed by this strategy does have a positive effect (according to the previously stated definition) in the transformation of societies because it has helped increase school attendance, resulting in more children eventually

obtaining a secondary education. On the other hand, seeing that information about the laptop is one-sided, an informed decision about adoption cannot be made. As such, a new form of colonialism through manipulation of information restricts people's freedom. This type of control may eventually result in the re-application of postmodernist action, which could be viewed as a negative outcome of the diffusion of the XO laptop.

Regardless of such possible negative outcomes, people view the participatory approach as a positive undertaking because they understand the importance of producing local content, which is the main focus of the XO laptop. In that sense, the machine offers the possibility for empowerment through translation and knowledge construction. In spite of this, the participatory approach is based on the modern model of education associated to the alternative paradigm. This notion could be viewed as a positive or a negative outcome; depending on the perspective taken to analyze it.

Localization. OLPC seems to have made a very good attempt at adapting the laptop to each recipient country's community. In fact, as context is a priority in new discourses of development (Kowal, 2008; McKeough et al., 2008; Motakef, 2007), the organization has made knowledge construction possible, leading to the empowerment of local knowledge. In this sense, it adheres to the alternative paradigm described by Melkote (2003) focused on empowerment and participation. Again, under the previous definition of the term *positive*, the XO laptop does act as a catalyst for the positive transformation of societies in developing countries, as empowerment eventually leads to self-sufficiency (Lucy et al., 2008). Logically, once a country is self-sufficient, it should have the capacity to develop unaided.

Accordingly, creating localized content constitutes the second aspect of OLPC's diffusion strategy. By offering communities the ability to construct knowledge, OLPC allows people to

develop new ideas that pertain to their specific context, avoiding cultural incompatibility. However, because Western ideologies may transfer along the way (Banerjee, 2009), the construction of local knowledge may be directed toward a specific goal, a concept further explained in the discussion of the third research question.

Self-sufficiency. Certainly, self-sufficiency is the main goal of the OLPC project and the organization manages to establish a base in order for the recipient communities to grow and attain poverty alleviation, considered a positive transformation of developing countries. However, countries using the laptops are currently still positioned within the core-periphery system described by Gunder Frank (1967). In fact, because recipient countries mostly depend on developed countries to receive the laptops, there are no signs to prove that self-sufficiency has been reached. In this sense, this relationship could have a negative impact on those developing countries because the fulfillment of their basic needs depend on external factors with developed countries asserting control (Jan, 2009; see also Gough, 2004; McLuhan & Powers, 1989). What is the likelihood of schools in developing countries suddenly becoming rich enough to afford the machines? While local businesses and local governments support some schools, others still need support from external sources, which creates the basis for the G1G1 program.

So when asked if the XO laptop acts as a catalyst for the positive transformation of societies in developing countries (assuming that a positive transformation entails the eventual fulfillment of basic needs), the answer is yes because it might help those societies attain poverty alleviation. However, those countries must be prepared for the implications this apparently selfless act of kindness by OLPC may have on their own culture. Hence, it is important to keep in mind that while economic development can possibly be achieved with this machine, the focus should not

drift away from the people at the risk of losing local cultures under economic endeavors, a fear shared by Makuwira (2006).

Discussion of Research Question 3

The third question asked about the direction of the vision that the XO laptop aimed to guide knowledge construction in developing countries, a question that will be answered mainly by elaborating on the participation and localization strategies (see Figure E4 for a visual representation of the central theories that relate to this question).

The Strategies

Participation. Newhouse (2002) described the participatory approach as being the modern way of doing things. Applied to this particular technology, it can be argued that education is taking a modern attitude because the transfer of knowledge has been transformed into the construction of knowledge. While the term *modern* stems from the dominant paradigm described by Melkote (2003), the approach forms the base of the alternative paradigm, which could be described as modern because it strays away from the traditional form of education adopted by the dominant paradigm.

Moreover, the XO laptop fosters the construction of knowledge through participation and collaboration. Indeed, Baskaran and Muchie (2006), as well as Boily (2004), argued that knowledge is now regarded as the key to development and economic prosperity. As such, participation serves as the conduit through which the reconstruction of knowledge is delivered in order to recreate and change societies, arguably for the best.

Localization. The answer to the third question lies behind the idea of knowledge construction. While OLPC offers the possibility to produce local knowledge and appears to be giving people freedom to manipulate the technology at will, communities seem to reconstruct

knowledge according to the subculture in which the laptop is embedded. Indeed, by inculcating the laptop into these communities through a specific framework, OLPC forces the people – albeit unintentionally – into Burniske's (2003) chain of doing. Accordingly, people who participate in this subculture will construct knowledge according to the alternative paradigm to which the organization adheres. Therefore, people are likely to construct knowledge toward a vision that is similar for all OLPC users, a vision of global participation through international networks, a concept depicted by globalization.

Lazerg (2009) asserted that globalization behaved in a similar fashion as colonization. Habwe's (2009) experience with the loss of the Kiswahili language due to the global economy can be superimposed to the XO laptop: It has the possibility to eradicate a culture simply for the ultimate cause of economic prosperity. However, McKeough and his colleagues (2008) stated that the elements that shape culture such as language correspond to a person's identity. Both elements shape the worldview in which a society lives and perceives itself on the global map. Considering that OLPC is working toward the particular goal of economic prosperity for the recipient countries, students may eventually feel the need to adopt Western traits and thus substitute their identity in order to meet their needs (Gough, 2004). Considering the influence of the dominant discourse (in which industrialized countries are perceived to have power and modernization is an opportunity to reach that same level) and the core-periphery system currently in place (where developing countries depend on industrialized countries to acquire resources), it can be asked whether this substitution is inevitable for developing countries to meet their basic needs.

Based on the prior information, I would tend to affirm that the reconstruction of knowledge is directed towards a vision that aims to meet some communities' basic needs. Yet, while OLPC's

intentions may seem pure, there still seems to be a transfer of Western ideologies through their various deployment techniques (such as educating teachers about the new participatory teaching model developed in the industrialized world and also by bringing the technology into their countries). In this sense, the basic needs are met by replacing traditional thinking with modern thinking. As such, students are likely to work towards the idea and the hope for economic prosperity that OLPC promises. The organization hopes to transfer its idea about education – which they believe to be the best – along to developing countries in order to help them. Having said that, I believe it is inevitable but to adhere to the dominant discourse and undergo modernization because industrialized countries have the economic power to support developing countries in their effort to achieve poverty alleviation.

Summary of Chapter

This chapter discussed the three main research questions. From the analysis of each, it was observed that the XO laptop used participation, localization, and self-sufficiency strategies to diffuse the laptop in developing countries. It was also observed that the XO acted as a catalyst for the positive transformation of developing countries, given that the term *positive* is defined as communities eventually meeting their basic needs. It was further discovered that OLPC shaped worldviews and that the construction of knowledge through the XO laptop was directed toward a vision created by the Western ideals of modernization.

Chapter 6: Conclusion

In sum, the analysis of the documents yielded a few themes: participation, localization, empowerment, and self-sufficiency. Indeed, not only do these themes come together to make the core of OLPC's strategy to diffuse the XO laptop in developing countries, but they also help discern the tension between modernization and the diffusion of information and communication technologies in developing countries. As such, through localization, OLPC has managed to get communities to participate in the project and also helped foster participation among the members of that community, increasing school attendance in the process. This method has not only helped empower local knowledge, but also helped people gain confidence and a sense of empowerment. However, these strategies were applied within a universal framework, which, in many cases, seemed to lead to dependency.

This research is thus important, as a new vision of development has emerged over the years. As one of the first technologies to use individual constructionist theory, the XO laptop represents a new kind of diffusion of innovation where ICTs are not implemented through a linear path as the modernization theory suggested and as other projects may have been implemented (Kiattananan & Koanantakool, 1999; Hinostroza et al., 2000.; Halse & Terzoli, 2002). Instead, it adheres to a new vision in which participation and knowledge construction are at the core. Investigating the motives of organizations such as OLPC, where education is their main objective and the technology is somewhat shaped by society, can help us understand the new vision of development more clearly. This new vision of development has the potential to bridge the digital divide, provide economic growth, leapfrog development, and override issues of inequality. However, one question will remain: are we deploying this technology wisely?

Certainly, OLPC's techniques have some underlying modernizing concerns. However, does it become necessary to do so for ICT projects? Although modernization was not their main mission, the organization still applies a *West knows best* approach simply by (1) offering the technology and (2) by offering it within a limited framework. Therefore, the tension between modernization and the diffusion of ICTs in developing countries exists within OLPC's desire to help. Yet, this conclusion cannot be generalized. Indeed, the partnership with Microsoft comes to question the true motives of OLPC. Moreover, this introduction opens doors for other ICTs projects with the same objectives, creating competition for humanitarian projects. While the nonprofit's initial goal was based on open source concepts, it is fundamental to acknowledge many countries' colonial past, which affected their current way of thinking. Previous attempts of modernization have (1) already left a sometimes negative idea in people's minds about outsiders coming in to create change and (2) already created a new worldview for the members of those communities. Therefore, some may be weary of new ideas coming from outsiders as it was illustrated in this thesis. As seen in the literature review, many do not want an education that strays away from the traditional. Thus, would it be modernizing to deny a country's demands? For example, one might argue that the introduction of Windows is modernizing. However, it can also be disputed that because many developing countries are already familiar with the software, introducing a new way of thinking might very well be considered modernizing. As Westerners, we think that we understand developing countries' needs and wants because perhaps we feel responsible for keeping them under the poverty line.

In any case, it can be maintained that because OLPC is trying to change people's views about education by presenting the importance of ICTs, it is inherently modernizing through a *West knows best* approach.

From this research, we can realize that no matter how humanitarian projects are trying to be, when outsiders attempt to diffuse an innovation, modernization is imminent even if it is not intended. Having said that, should we deny developing countries the opportunity to benefit from ICTs as it may help them alleviate poverty and fulfill their basic needs? As much as we try to minimize the transfer of our ideologies, a part of the Western mind will, more often than not, transfer to the societies that development teams are trying to help because they are showing them a specific way of doing. It is also important to note that while knowledge construction might be local after ICTs are fully implemented, traces of Western ideas may remain because they constitute the base of their new worldview. Therefore, although OLPC does advocate empowerment, the strategies used lead the communities to create knowledge based on Western ideals, which makes the laptop adhere to the dominant discourse.

So, although new visions of development try to stay away from the traditional, Westerners offer a way beyond the traditional, which is now considered new and modern, not only in developing countries but in Western countries as well (Newhouse, 2002). Through diffusion techniques, early adopters will influence the rest of the community and thus modernization still occurs, not only from outsiders, but now from insiders. Modernization is being done much more subtly. In this sense, while we are teaching a man how to fish, we are teaching him to fish *our* way and that is what lies at the heart of modernization.

Practical Implications of the Results

On the practical side, the results of this research can be applied to other ICT projects with humanitarian missions. Indeed, OLPC was a pioneer in personal machines for children in developing countries. With an initial mission that does not implore personal capital expansion, OLPC has managed to create a subculture of like-minded people who wish to change the face of

education in developing countries in order to reach poverty alleviation. Although their ultimate goal of poverty alleviation cannot be confirmed as of yet because of its extensive process, OLPC, as well as other projects, must consider the possible negative outcomes of such endeavors. While they may seem very enthusiastic about their projects, issues of cultural incompatibility may arise within the diffusion of their technology. The negative consequences of the implementation of ICTs, such as added costs, cultural incompatibility, and exposure to unsustainable practices, need to be considered because it is only then that countries can make an informed decision about whether they should apply that new technology in their country and whether it is the right choice for their current situation.

This research depicts a scenario in which an ICT was introduced into countries that were never or little exposed to such technology. Looking at the perspective of both the organization and the people using the laptops permitted me to understand the kind of diffusion that people with new visions of development try to implement. Decisively, although this vision aims to relieve people of their misery, it can be understood through the strategies used that countries might be weary of these new techniques, especially because of their colonial past that left them with feelings of distrust toward Western ideas.

Moreover, the findings of this study imply that modernization cannot be avoided. As previously explained, endeavors such as OLPC cannot prevent ideas and knowledge to transfer to developing countries, inevitably changing the recipient country's worldview and thus the future of that country's development. As such, the UNDP has decided to put in place a Human Development Report solely focusing on revisiting the concept of human development (UNPD, 2010). However, this report will apparently still suggest a new way to change development thinking and policies. Having said that, this thesis serves as a good source of information

because it focuses on the tension between modernization and the diffusion of new technologies in developing countries by developers who believe that their ideas are the best. This thesis could help developers comprehend the consequences of deeply getting involved in societal change. Other initiatives such as the MDGs could then be redefined in order to accommodate local culture rather than using universal models to reach poverty alleviation.

As this thesis explored the new vision of development and the tension between modernization and the diffusion of new technologies in developing countries, those hoping to diffuse ICTs in developing countries should be careful about the transfer process, because in the long run it could affect a society at a deeper level by changing its culture's worldview and thus its identity.

Limitations and Direction for Future Research

One of the main limitations of this research is that it only looked at two countries in which the laptop was deployed. Although OLPC is trying to implement a universal framework, the main issue raised across the documents was that the project required localization. Therefore, while both countries showed similar issues, they each needed region-specific adaptations. Therefore, future research should look at how the XO laptop was deployed in other countries that may have received the laptop at a later date. Indeed, OLPC showed that it learned from its mistakes, therefore later adoptions might have experienced the laptop differently.

In any case, looking at two specific countries outlined the base for future researchers who want to further understand the organization, as many questions are still left unanswered. The perspective of my research was also limited to a specific timeframe (2006 to 2008). Indeed, the peak debates about the organization center on its partnership with Microsoft. As the nature of my research focused on the initial goals and strategies of OLPC, this issue could not be observed at a

profound level. Having said that, my research leads the way for future studies regarding the introduction of new technologies in developing countries and the implications this could have on developing countries and new visions of development.

Moreover, since this analysis primarily focused on the consequences of the tension between modernization and the diffusion of ICTs in developing countries, future research should focus on ways to avoid modernization or ask whether this modernization should be avoided at all.

While the use of CMC as a data-collection method allowed this research to be analyzed objectively, the issues of trustworthiness that CMC imparted may have limited the scope of my results. Undeniably, the use of document analysis and the analysis of online discussions through mailing lists does not allow experiencing the environment in which the entries have been written. The issues of trustworthiness associated with these data-collection tools imply that future research should seek personal interaction with the participants in the form of interviews. Essentially, interviews serve to identify perspective and context (Lindlof & Taylor, 2002). Thus, laptop deployment-specific questions should be asked to OLPC members in order to emphasize the research's goals in terms of topic and criteria (Bonneville et al., 2006). The use of semi-structured interviews, for instance, would allow the possibility for follow-up questions (Kvale & Brinkmann, 2008), permitting a deeper understanding of OLPC's mission.

Although this thesis aimed to seek social change, Cox et al. (2008) warned that one must acknowledge that change might not happen directly because of this research, or happen in this lifetime. However, research that works toward social change lays a path for future researchers.

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Appendix A

Comparison of Development Communication Theories and Approaches in the Modernization and Empowerment Frameworks

	Development Communication in the Modernization Framework[a]	Development Communication in the Empowerment Framework[b]
Phenomenon of interest/goal	National and regional development, people development, community improvement	Empowerment of people, social justice, building capacity and equity
Belief	Underdevelopment due to economic, political, cultural, geographic, and individual inadequacies; due to lack of power and control on the part of the existence of a single standard (as articulated by diversity standards)	Underdevelopment due to lack of access to economic, political, and cultural resources; underdevelopment people; experts)
Bias	Cultural insensitivity, environmentally unsustainable, standardization; change directed by external sources and ideas; deterministic process toward a predetermined end dictated by an external agency; pro-innovation bias; individual as locus of change and blame; victim blame hypotheses	Cultural proximity; ecological, diversity of standards; change directed and controlled by endogenous sources and ideas; open-ended and ongoing process of change; system blame hypotheses; group or community is paramount
Context	Macro and micro settings; very little interest in local cultures or power relationships and structural impediments in host society	Local and community settings; cognizant of formidable power inequities and systemic constraints
Level of analysis	Nation, region, individual	Individual, group or organization, community
Role of change agent	Expert, benefactor, nonparticipant	Collaborator, facilitator, participant, advocate for individuals and communities, risk taker, activist
Communication model	Linear, top-down, transmission of information using big mass media; media treated as independent variables with direct and powerful effects; pro-source bias; asymmetrical relationship (subject-object)	Nonlinear, participatory; used to convey information as well as build organizations; increased use of small media, traditional media, group as well as interpersonal communication; media treated as dependent variables; communication used for transaction, negotiation, understanding and not for powerful effects of a source; symmetrical relationship (subject-subject); horizontal flows

[a] Diffusion of innovations, social marketing, entertainment-education

[b] Participatory action research, empowerment strategies

Comparison of Development Communication Theories and Approaches in the Modernization and Empowerment Frameworks *(continued)*

	Development Communication in the Modernization Framework	Development Communication in the Empowerment Framework
Type of research	Usually quantitative (surveys); some use of focus groups; contextual or evaluation research	Quantitative and qualitative; longitudinal studies; labor-intensive participatory action research
Outcome desired	Modernization; economic growth; political development; infrastructure development; change in people's attitudes and behavior toward modernization objectives	Increased access of all citizens to material, psychological, cultural, and informational resources; honing of individual and group competence, leadership skills, useful life, and communication skills at the local level; honing of critical awareness skills; empowered local organizations and communities

Source: Melkote (2003)

Appendix B

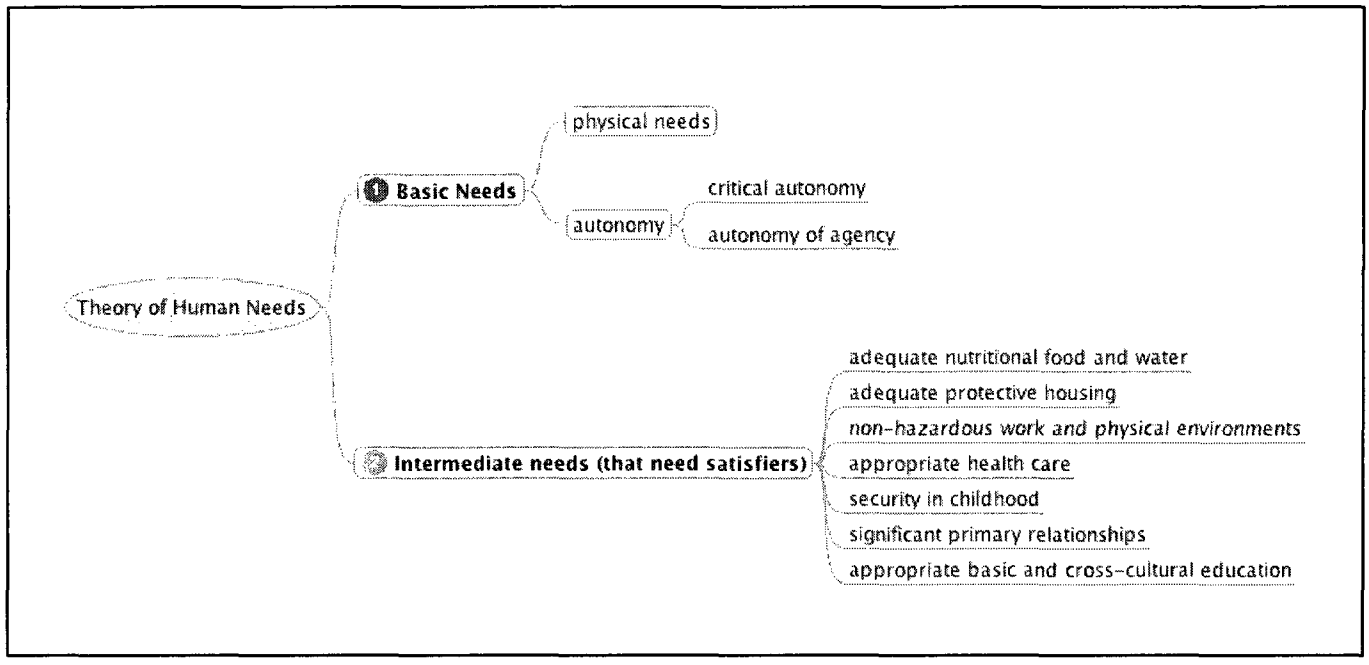

Figure 1. Theory of Human Need as described by McGregor (2004)

Appendix C

Themes Emerging from the Document Analysis

Themes	Deployment guide	Educational activity guidelines	India/Khairat Chronicles	Nigeria/Galadima
Universality	The basic approach and methodology are common to all workshops.	The concept of the Journal activity is developed as to be understood across cultures; The OLPC initiative requires international involvement.	Educational projects position the student within a local and environmental context.	
Participatory approach	Urges strong communication between schools, communities and OLPC; Empowerment of local knowledge through community translation; OLPC welcomes the community's input; Focus on teamwork and open source within both the schools and the community.	OLPC understands that each person brings a unique set of ideas and experiences; Recommend using already existing examples of activities; Value sharing of information; Focus on collaboration, expression and collaborative critique; Insists on using the mesh network.	Students help each other with the various activities (higher levels help lower levels); Strong emphasis on collaboration; Active participation from the community, such as parents, villagers and local businesses.	The whole community's collaboration has brought together the OLPC project; Teachers collaborate and share experiences and knowledge concerning the XO laptop; Children help each other with their activities and projects.
Localization	Stresses the need for cultural knowledge and implications (context); Stresses customization and localization of content, albeit through the OLPC model; Urges the creation of local policies; Stresses open source.	Knowledge and content should be adapted to local children of all ages; Advises for activities not to adhere to traditional models of learning; Focus on the construction of local knowledge; Insists on activities to be location-specific.	Work with local businesses for the empowerment of local knowledge; Keyboards are adapted to the context (English and Marathi); Activities maintain traditional culture.	Children are encouraged to apply their knowledge to a local context; Teachers develop their own activities; Children have developed a dictionary of local languages.
Empowerment	Stress that children have the capability to perform all tasks themselves; Empowerment of local content through localization; One of their goals is to strengthen in-country teams; Aim for long-term self-sufficiency.	Encourages students to take responsibility for their classmates; Encourages children to explore, experiment and express themselves, both individually and in groups.	Children reinforce their knowledge by teaching others.	

Themes Emerging from the Document Analysis *(continued)*

Themes	Deployment guide	Educational activity guidelines	India/Khairat Chronicles	Nigeria/Galadima
Dependency	Stresses that the country is responsible for training and installation; XO laptops are delivered through global partners (Global Forwarding and UNDP); Stresses that ultimate decision rests in the hands of the country; Presents the basic technology needed within the country prior to installation; Need for electric supply.		Depend on Ministry of Education for deployment of project; Strong support from local community; Children tend to stay in class and work with the laptop during recess.	The OLPC project has been shut down for lack of funding.
Digital divide	Need for electric supply; OLPC is working on alternative power sources to accommodate everyone; Try to decrease the digital divide through pushing people into creating new policies.		Foster equality between boys and girls (virtually no gender division).	Schools have no access to water or electricity; The school has leapfrogged from chalk-and-board technology to ICTs.

Appendix D

Themes Emerging from the Online Discussions

Themes	OLPC-India	Nigeria-opensource
Universality	A user reproaches OLPC of looking at India as a big state, while it should be looked at from its individual states; There is a hope for the whole nation to be connected through the mesh network; It seems to be very hard for OLPC to implement a universal concept on a local level because every location has specific requirements.	States that the XO software is the only one developed for the developing world.
Participatory Approach	There are a lot of suggestions from the community as well as volunteers; OLPC notes that it highly welcomes suggestions and then takes those suggestions into consideration; Diplomatic answers are given to people complaining about the project; Volunteers understand that OLPC's process is to learn in groups.	Community translation was the center of discussions; OLPC fails to respond to a few posts.
Localization	Bloggers point out that India is a very diverse community and that this aspect needs to be taken into consideration for deployment; OLPC believes it necessary to understand the needs of India in particular; Users understand that content should be localized and used locally; A blogger suggests partnering with local businesses to entice the government to get on board with the project; Some users are weary of OLPC because some of its thinking goes against India's way of thinking.	Discussions focused on content and website translations.
Empowerment	A user pointed out that the laptop might help illiterate parents gain some knowledge.	
Digital Divide	A user pointed out that some proper training should be done regarding the use of laptops because some may never have seen one before; Strong belief in leapfrogging; Advocates translation for the increase of communication between different communities; OLPC's G1G1 program advocates equality regarding receivers of the laptops, prioritizing the rural communities; Acknowledge that electricity is a big problem in the village areas.	

Themes Emerging from the Online Discussions *(continued)*

Themes	OLPC-India	Nigeria-opensource
Dependency	Laptops are only given to the child until he becomes 18; Someone viewed the XO laptop as the user's main source of information; A user understood that some schools need help from abroad; Some believed that using non open-source technologies could be compared to an addictive drug.	There are no posts after October 2008.
Environment	Strong suggestion about joining the Kyoto Protocol bandwagon; Discussion about using alternative power for developing countries in order to power up the laptops.	

Appendix E

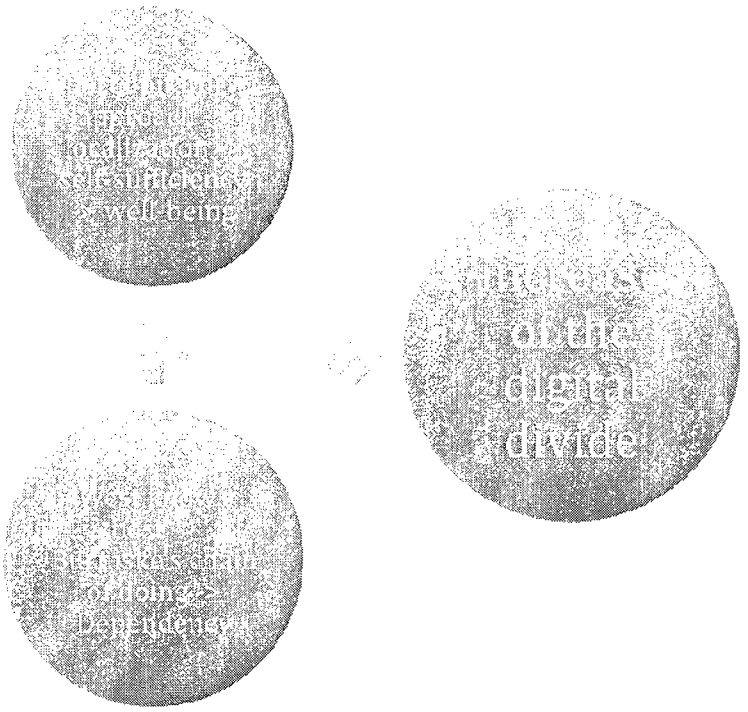

Figure 2. Visual representation of the theories relating to research question 1.

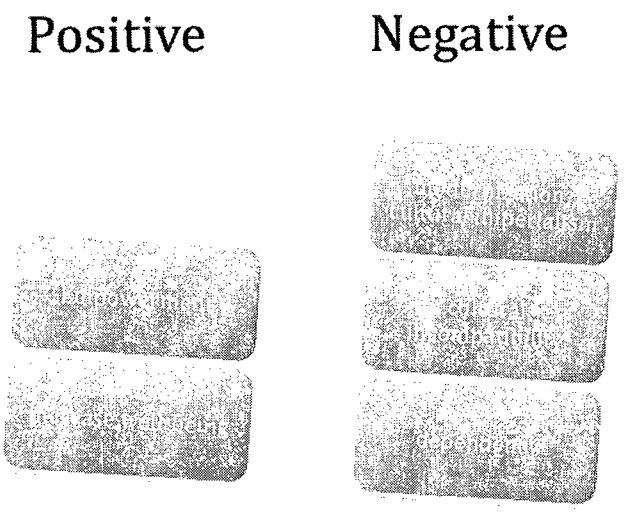

Figure 3. Visual representation of the theories relating to research question 2.

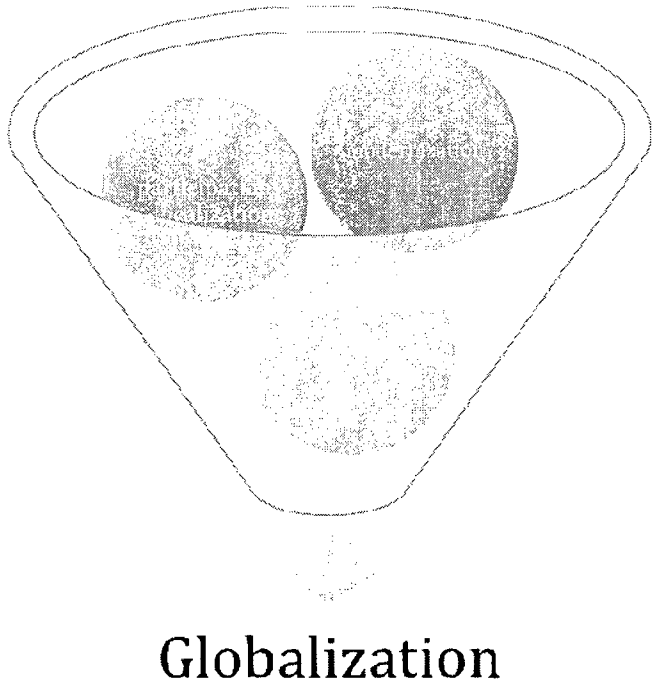

Figure 4. Visual representation of the theories relating to research question 3.