FOREWORD

Background

This report is the result of an undergraduate thesis work in Communication for Development at Malmö University, Sweden. The study treats the social dimensions and impact of information and communication technologies (ICTs) in economically weak environments. Its objective is to contribute to the creation of a framework for the assessment of ICT efforts in marginalized regions from a critical social viewpoint. The study has been carried out in association with the NGO Funredes and in connection with its Olistica initiative. Olistica – the Observatory in Action of Social Impacts of ICTs in Latin America and the Caribbean[1] – is a network of researchers and activists, working for "the strengthening of social actors in the LA&C region in order to consolidate an action-research human network capable of conducting research about the incidence of ICTs in their local context" (Olistica 2000). Most parts of the study were carried out in the Dominican Republic, where I was based at the Funredes office in Santo Domingo.

Notes & Acknowledgements

Please note that the purpose of this report, whatever criticism it may express towards some phenomena, is not to vilify any person or institution. The representatives and workers of the Lincos project that I had the privilege to meet, were with few exceptions, if any, indeed amiable persons whose intentions are no doubt good. Rather than pointing out "bad guys", the aim of this study and its critical approach is to open up the field for alternative understandings and propose new ways of reflection and discussion.

I would like to thank Funredes for hosting me in the Dominican Republic, particularly my director, Dr Daniel Pimienta and my cyberspace tutor, Dr Michel Menou of London City University. Thank you also to members of Olistica for valuable guidance and discussion. The fieldwork would have been much more difficult without the help of Dave Hotstream, the Mercedes Family and John Saunders, all of whom I remain in debt to. I am grateful to all the interviewees who offered their time for my work, and to the people of the villages I visited for their hospitality.

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[1] **O**bservarorio **L**atino Americano y Caribeño del **I**mpacto **S**ocial de las **TIC** en **A**cción, www.funredes.org/olistica

INTRODUCTION

TERMINOLOGY

Developing Countries

I maintain that the term "development" (as it is typically used in this context) as well as the dichotomic distinction between "developing" and "developed countries" are representations of a modernist worldview. Not only does this terminology imply that the Western/Northern countries have reached a stage where societal change is no longer necessary, but it also suggests that in the cultural, political and economical model of these countries, the path has been staked out for the rest of the world. As I harshly oppose this perspective, I do not feel comfortable with using these terms. Using them "because there are no good alternatives", as many representatives of "alternative" worldviews choose to do, has not been considered a worthy strategy. In this essay, instead of talking about countries, I will with few exceptions talk about regions, or environments. Further, rather than classifying these regions according to some biased idea of development, I will speak of them as "economically weak/powerful" or as "marginalized/dominating". I do not in any way claim that the terms that I use are the most adequate ones and I do certainly not suggest that they succeed in capturing the complexity of the phenomena they seek to denote. I do believe however, that they to a lesser extent than the terms referring to "development", help perpetuate a political perspective that forms the backbone of the very ideas that this study seeks to challenge[2].

ICT Efforts

An *ICT effort*, in the definition used by this study, is any deliberate attempt to employ information and communication technologies in (or sometimes as) strategies to achieve social, political or economical ends on a public level. In the typical case, it is an ICT-for-development project, carried out nationally, regionally or locally, by the government of an economically weak country, a business, or an international development agency.

Critical

The term *critical* is used predominantly in this essay to denote a certain approach to investigation, based on a profound questioning of established truths and practices. This approach is discussed further below.

THE APPROACH OF THE STUDY

The Critical Perspective

No efforts will be made to hide the fact that this study is based on a critical perspective. To be sure, all research is critical to some extent, as every act of investigation initiates with a discontent of the current state of things, if only the lack of "knowledge" in a certain area. Many research efforts take, beyond that, a progressive stance and try to point out fallacies in

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[2] It should be noted that many terms related to "development" will actually be used throughout the essay. As the concept is so established, it is impossible to escape it totally. I will use these terms when referring to *discourses, institutions, and professionals that may be understood as belonging to the sphere of "development"*. That is to say, they are themselves essentially dependent on the concept of "development". Hence the use of terms such as "ICT-for-development", "development theory", "development worker", "development agency" et cetera.

existing systems, in order to correct and adjust these systems (Alvesson & Deetz 2000a[3]). Used here, however, the term refers to a perspective that generally questions the very systems, rather than trying to correct their "flaws"(ibid.). Researchers working within the critical tradition typically aim to unmask hidden conflicts, oppressive practices and power structures in the conventional. The critical perspective is often driven by a transformative social vision and an ambition to explore alternative societal practices, based on notions of autonomy, solidarity, self-determination and emancipation.

The purpose of the critical approach is not to point out rights and wrongs in society, but in no way does the critical investigator claim that her work is free of values – the recognition of science as ideology is indeed one of the fundaments of critical research. The ambition is to reveal social conflicts but without delivering ready-made recipes for resolving them."The intellectual role […] of the critical researcher consists in creating the conditions that allow an open discourse between different social actors and not in establishing a superior insight or an authoritarian truth" (ibid: 155). In such discourse, the critical approach aims to give recognition to issues and voices that are typically neglected or hidden and seeks to reveal practices that perpetuate such suppression. The critical researcher, thus, is guided by a distinct political mission on one hand, but avoids, on the other hand, to try to establish firm agendas. The aim is not to force upon people a certain understanding of reality, but "the views of the skeptics may [...] be put forward as valuable contrasts to dominant assumptions" and "alternative values and conceptions may encourage reconsideration"(ibid.). The objective, according to Alvesson & Deetz (ibid: 162) is "to create new concepts and stimulate new practices for members of society and researchers, in order to increase understanding of the social life".

In the context of this study, the critical approach serves to direct attention to issues that are of relevance to the alleged beneficiaries of ICT-for-development projects, and to open up discursive spaces where such issues can be discussed and reflected upon. The critical fundament of the study embraces critical discourse in academic fields related to the study. This involves the adoption of parts of certain academical streams, notably the "Post-Development" approach to development, the Participatory Design tradition and critical theories of technology[4].

PURPOSE & STRUCTURE

Information and communication technologies have become major players on the development arena. ICT strategies are now incorporated into the programs of most foreign aid agencies and a large quantity of NGO's is focusing on the issue of information technology. Governments of economically weak countries who do not wish to appear as backward are

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[3] This work is written in Swedish and all quotes are translated by me. The book is partly based on an original in English (Alvesson & Deetz 2000b)

[4] Escobar (1995, 1994) and Rahnema & Bawtree (1997) belong to the "post-development" works that have inspired this study. In the specific field of ICT-for-development, critical inspiration is gathered from Heeks (1999a, 1999b), Avgerou (2000), Dahms & Ramos (2002), Ramos et al (2002), and Uimonen (2001), among others. The discussion on alternative/critical approaches to the design process is particularly informed by the Participatory Design tradition, and drawing from such works as Ehn (1988), Ehn et al (1987), Dahlbom & Mathiassen (1995), Ramos et al (ibid), and Sclove (1995). When it comes to theories on the politics and ideology of technology, consulted works include Feenberg (1999, 2002), Feenberg & Hannay (1995), Pfaffenberger (1992), Winner (1993, 1995), Sclove (ibid) and Marcuse (1991, 1999). It should be acknowledged that not all of the authors referred to would admit to belong to the critical tradition.

readily joining in and so, with the help of development banks and multinational companies in the lookout for new markets, the new technologies are spread to all corners of the world.

In the intellectual arena, many are those who want to contribute with a critical understanding of what this technological "revolution" brings to the population of the world, not least to its marginalized inhabitants, and not seldom in terms of neocolonialism, techno-imperialism and new forms of oppression and dependence (e.g. Smith 1993, Webster 1995, Hernandez 1999, Armitage 1999). Dominating the discourse in the field however, are the technocrats, preaching the gospel of information technology and the healing powers of the computer. Mainly representing business and financial institutes, or governments and organizations in cooperation with these, their primary concern is rarely the actual people that are claimed to benefit from the new technologies.

Left behind is the process of strengthening the marginalized groups in the regions that are now at the foot of entering the so-called information age. Left behind is the creation of tools and agendas for these people to critically evaluate and respond to the current development, and build a concept of what they mean to them. "[N]ew languages are needed that allow different groups of people (experts, social movements, citizen's groups) to reorient the dominant understanding of technology", in the words of Escobar (1994:221). This essay tries to bridge the gap between different critical understandings of technology on one hand, and the people who could make the most use of such understandings on the other hand, by connecting critical thought from relevant fields to actual ICT situations. In this effort, I am subscribing to the ambition of the Olistica project (Menou 2001):

> *"Whether or not ICT are revolutionizing societies, actors and especially the people supposed to enjoy its unprecedented benefits should be able to have their say in the process of policy formulation. To that end they need to have instruments and methods that allow them to judge what is occurring. This is the purpose of the methodological component of the Olistica project"*

The objective of this study is to present an introductory contribution to the creation of a framework for the assessment of ICT efforts in marginalized regions from a critical social viewpoint. Such a framework should inform the creation of social assessment models, the purpose of which would be to assist critically minded activists in discussing, reflecting upon and comprehending the social dimensions involved in any ICT experience. This study poses the question "How can a critical social perspective inform the assessment of ICT efforts in marginalized regions?" and tries to answer it in a constructive way. The first part of the study departs in an examination of typical approaches to ICT in the development context and traditional ways of assessing ICT efforts in economically weak regions are taken into critical examination. It is argued that the common ways of viewing and appreciating ICT in the development context, as represented by existing assessment models, is neglecting aspects of fundamental social relevance and the need to create an alternative framework is recognized. In order to give support to such a critical approach, a theoretical discussion follows, which treats the social dimensions of technology, focusing particularly on the development context, and draws on critical thinking from relevant fields. During the course of this discussion, attention is drawn to suggested investigational "themes" to be included in critical assessment models. In the second part of the text, a case study of an actual "ICT-for-development" effort – the Lincos Project in the Dominican Republic – follows. With the help of observation, as well as interviews with the so-called beneficiaries and other stakeholders of such an effort, the applicability and relevance of the suggested themes is investigated and illustrated.

The expectation of the author is that this work can serve as a platform for further elaboration of a framework for ICT assessment from a critical social viewpoint, eventually resulting in assessment models to be used in the field.

ON METHODOLOGY

The empirical investigation of this study is informed by critical thinking introduced in the theoretical discussion that makes up its larger part. By bringing forward arguments from different critical traditions, the theoretical part of the study provides an "interpretational repertoire", against which the experiences from the field can be measured – a process that in turn develops the theoretical concepts. "In the optimal case, an interpretational repertoire with a good breadth, assists the researcher in developing a critical fantasy and avoid hyper critique. The powerful ideas and concepts of critical theory [...] are used here in a sensitive way, that is they guide the interpretations but are at the same time open to the empirical material" (Alvesson & Deetz 2000a: 206). The interpretational repertoire is undoubtedly the fundament of this study and making up the lion's share of the text, as the reader will experience. The elaboration of this theoretical part of the study has been carried out in parallel with the case study, however, and its concepts are informed by the experiences from the field. The process has thus been an iterative one, a fact that is neither properly, nor proportionally, reflected in the structure of this report. Nevertheless, it should be stressed that this is fundamentally a theoretical work and that many of the concepts introduced in its theoretical discussion are never treated in its finishing empirical part.

Choosing persons for interviews and locations for observation has not been a strictly organized task, aiming towards total or generalizable representation. Instead, this process has been an evolving one, in which selections have been made during the course of investigation, combining a non-probability "subjective selection" (interviewees and observation sites are hand-picked [Denscombe 1998]) with a "snow-ball selection" strategy (one experience leads to another [ibid]). I have interviewed Lincos staff members, Lincos community committee members, Lincos users, ordinary community members, village politicians and the director of the Dominican Lincos project. I have further been attending meetings and classes and also acted as an ordinary Lincos user. In addition to these field impressions, I have engaged in documents analysis of official Lincos material. The aim has been to gather a multi-faceted impression of the Lincos experience, rather than some sort of objective representation of reality. I have sought to spend a considerable amount of time in the communities with the objective of learning to know both the villages and some of their inhabitants. Most of the interviews have been organized as (recorded) chats about the Lincos experience, during which I myself have guided the direction of the discussions according to certain issues. The way I have been carrying out interviews and observation has reminded more of that of a journalist, than that of a traditional researcher. The reason for this is simple; I have aimed more towards a rich image of the Lincos project, to supplement and illustrate the theoretical discussion, than at a scientific "result" to prove it right.

The empirical material has not been organized into numbers, tables or figures. Neither have I systematically presented interviews and observations in an orderly fashion. Instead, the field impressions are laid out in a semi-narrative style, with observations, interview excerpts and mere informational "facts" mixed together, providing a many-sided and hopefully rich account of the Lincos case. This account is presented in light of, but not rigidly following, the theoretical framework outlined in the preceding sections of the essay. This way of summarizing the field study is in part reflecting the approach used when going to the field. With the continuously evolving theoretical discussion in mind, I went out to study an actual case with an open mind, yet attentive to certain issues. Impressions were organized during these field studies as well as later. The narrative style also serves to underline the fact that I have not engaged in a formal assessment of the Lincos case. Instead, the case study in combination with the theoretical discussion has been a way to elaborate a basic understanding of how such assessments could be developed according to a critical social approach to ICTs in the development context.

The Lincos case, although rare in some regards, is in many ways representing, and sometimes even exaggerating, an approach that is common in the ICT-for-development arena. Its focus on technology, its neglect of local knowledge, its exclusion of users from the design process, are all frequent attributes in the dominant way of conducting ICT work in economically weak regions. Indeed, the case was to a large extent chosen because of its representation of a certain approach (Denscombe 1998). Still, as Alvesson & Deetz argues (2000a: 32), "in research of 'dissensus character', the generative capacity (the ability to challenge dominating assumptions, values, social practices and routines) in an observation is more important than the representational validity".

LIMITATIONS

This work is a so-called Minor Field Study and it is equivalent of ten weeks full-time engagement. Most of this time has been spent in the Dominican Republic. Of the total ten weeks, only around a third has been spent visiting the Lincos sites. This time has been divided between the location I chose for depth observation and interviews, the site chosen for complementary observation and short visits at three other Lincos sites. The relatively limited time spent doing actual fieldwork is due partly to a limited time frame, but also to priority. In critical research projects, "the important task is not only or primarily to come close to 'the natives' and understand the unknown, but also, and more importantly, to gain distance and a critical perspective in relation to a material that is all to easily regarded as normal, natural and rational. The critical ethnography may thus reduce the time spent on location in favor of a critical consideration of the material" (Alvesson & Deetz 2000a: 222).

It is nevertheless self-evident from the above account that the resources of this project have imposed serious limitations on its scope and outcome. As explained earlier, this study seeks to arrive at some general themes that can be of value to (so-called) beneficiaries and activists when assessing ICT efforts in marginalized areas from a critical social viewpoint. Supporting such an effort with empirical studies could easily become a large-scale project. The idea of allocating only a couple of weeks for a single case study might not seem as the most appropriate way to go about, in spite of what was mentioned above. One could imagine, for example, a repetitious process, extended to several countries, various sites and different types of projects, where themes develop into a more structured set of suggested indicators, which are then allowed to be tested extensively and further elaborated. On another level, one could also think of a process where the actual beneficiaries are involved beyond mere interviews, and identification/observation by the investigator, and allowed active participation in the creation of assessment tools[5].

Given the resources of this project, such visions have obviously not been realized within its scope. Instead of trying to establish a structure of indicators, it halts at an aim to broaden the discussion involved in such work, to demonstrate how it may be informed by a critical approach. Its ambition is not to reach a conclusion on the most appropriate model for social assessment of ICTs and to have this model tested and proven efficient, but rather to propose a framework of issues that ought to be included when developing such models.

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[5] A research project similar to the one proposed is in fact already being carried out by Olistica. A network of observers all across Latin America and the Caribbean are engaging different actors in a participatory elaboration of social assessment indicators (Olistica 2000, Menou 2001).

1a. APPROACHING ICT IN THE DEVELOPMENT CONTEXT

The relationship between society and technology has been a prevalent matter for philosophical discussion since the industrialization of the Western world. Intellectuals from Marx to Heidegger have reflected intensively on the difficult issue and the debate is in these days certainly not of less interest than before. Today many scholars insist that during the two or three latest decades, the world (or at least parts of it) has seen the rise of a new historical era, characterized by, among other features, the globalization of capital and human relations, and the increased significance of information and information technology. Whether one accepts this notion of a fundamentally new epoch in the history of humankind (e.g. Castells 1996), or instead chooses to stress the continuity of capitalist order (e.g. Hernandez 2001), the significance for the industrialized society of information technology and the space-, time- and work-obliterating potentialities that it connotes, is clearly undeniable. And as multinational corporations seek to explore new markets, while governments, aid agencies and NGO's look for modern strategies for their development projects, information technology is no longer exclusively an issue for the industrialized world, but now approaching economically poor regions at high pace. This process is not easily analyzed and it opens up for debate on a width of issues.

In order to pave the way for critical understandings of ongoing processes, and to produce a critique of dominant views, as well as alternatives, one must be willing to question conventions and explore alternatives on several levels. To fully grasp the social aspects of ICTs in the development context, without taking established and traditional interpretations for granted, it is therefore necessary to start out with a discussion of the social dimensions of technology and the ways in which these are appreciated by different actors. Most efforts aiming to interpret, evaluate or envision ICT activities fail to consider issues that are of fundamental social value to the people affected by the design and appropriation of the technology. This is true of the dominant approach to ICT-for-development but also, unfortunately enough, of most of its few challengers.

In the following section, I will make an attempt to outline the characteristics of two standard approaches to ICT in the development context and point out some of their fallacies from a critical social viewpoint. I thereafter present some entry points for a critical contestant to these approaches. The approaches outlined should be seen as generalizations, to which few, if any, organizations or individuals fully apply.

THE DOMINANT APPROACH

Significant of what we may define as the dominant approach to ICT in the development context is its priority concern for *access*. Access to information technologies is viewed as the road to a better life for the inhabitants of economically weak regions. Not only is the advent of these technologies claimed to increase the "competitiveness" of a society and its people (which in turn is regarded as the key to a prosperous life), but the technologies are argued to possess in themselves qualities that will enhance the well-being of its users, through amazing communication opportunities and a never before experienced access to information and knowledge (between which a distinction is seldom made). This approach is closely related to the Information Society (or Information Age/Era) discourse, whose underlying beliefs are that "a total social transformation is predicted and that this transformation is generally a good

and progressive movement" (Uimonen 2001:90). This thinking has influenced the major actors in the development arena.

At focus of attention is the struggle against the so-called "digital divide", which in the typical interpretation is understood as the uneven global distribution of ICT artifacts and systems, believed to be the main obstacle for the progress of societies conceived as less developed. Academics, report-writers, journalists and businesspersons are seemingly competing to present the most striking example or figure of how this great rift reveals itself. "Manhattan has got more computers than the whole of Latin America", "Luxemburg has more Internet hosts than Africa" and so the talk goes. Unfortunately, "progressive" forces have in many cases not hesitated to embrace this concept. Not only are these accounts most tiresome to read but, in stressing them, authors act as if uneven global distribution of material wealth were a new phenomenon, and one isolated from the global economic system that may be argued to perpetuate such inequalities (i.e. Smith 1993). Further, in the words of Uimonen (2001), "[b]y framing this divide in a technocratic terminology according to which progress is inseparable from access to technology, the concept of the digital divide serves to conceal the political nature of technical systems".

The mere highlighting of this so-called divide does not only indicate technological determinism, but it also reflects a modernist world-view and development approach, implying that what most urgently needs to be done is to fortify the deployment of ICT:s in marginalized countries, thus adapting them to the socio-economic model of the economically powerful regions. Even among those forces eager to actually reach out a helping human hand, to "guide" marginalized people with tenderness into the Golden era, the basic presupposition remains intact: there is a digital divide, we are on the good side, they are on the bad side – we must help them across. This is the underlying assumption that is never questioned. And so Western culture constitutes an opposite, in which its own splendor is reflected and its "progress" justified.

Business and Politics as Usual

The dominant approach is closely affiliated with the ambitions of governments, large-scale development agencies and corporations of the information technology sector – more often than not springing out of different forms of collaboration between the three. Mergers between public and private interests are rarely viewed as problematic, and it is often stressed that "[a] close working relationship between business and government is critical" (Harvard Readinessguide 2001). Deregulation of the national telecommunications market (and virtually all other markets as well) is militantly promoted as an essential step for any nation with the least interest in taking part in the information revolution. Basically, ICT-for-development in this form fits well within a neoliberal agenda for the economically weak countries. "The establishment of administrative and economic systems based on predictable and transparent rules, most especially good governance, which promote free development of ICT, is the key to success", the Digital Opportunity Task Force declares accordingly (2001).

The concentration on aspects of infrastructure further reflects the vision of business to conquer new markets and increase sales in all corners of the world. Business corporations are indeed encouraged to join in on ICT-for-development projects at the prospect of getting "access to largely untapped customer markets" (Ekenberg & Asker 1999: 48). Together with the ambition of governments – particularly those of economically weak nations – to advertise their achievements and promote their countries as competitive ones, this striving helps produce and perpetuate a belief in inherent, benign powers of the new technologies. Moreover, it reflects a neglect of the social dimensions of ICTs. From a social viewpoint, access or infrastructure as such can hardly be regarded as categorically beneficial. Whatever it is that is to be "accessed", and in what ways, must be subject to sophisticated scrutiny by the people affected.

Modernism & Technological Determinism

The dominant view can be understood as essentially modernist. It commands marginalized people to hop on the "information superhighway" and asserts that "[t]hose countries and regions that do not actively participate will be left behind" (Ekenberg & Asker 1999:6). Not seldom, the dominant approach includes such implicit or outright threats; the G8 Charter on Global Information Society in 2002 maintained that "those developing countries which fail to keep up with the accelerating pace of IT innovation may not have the opportunity to participate fully in the Information society and economy" (quoted in Uimonen 2001:98). It is being emphasized that adapting to the "networked economy" (a concept that happens to correlate well with the economical system favored by the powerful nations) is of utmost urgency. "Without a concerted effort by the developing world to get ready for the global networked economy, [...] the gaps in living standards between developed and developing countries will only grow wider"(Harvard Readinessguide 2001). By these means, leaders of economically weak countries, and subsequently their inhabitants, are incited (if not forced) to put faith into the acclaimed wonders of Western technology and the economical and socio-cultural vision its promoters market. In stressing the prospect of "leap-frogging" – a favored metaphor of the representatives of this approach, indicating that marginalized countries with the help of modern technology can bypass several steps on the path to advanced society – the view of development as a series of predefined steges, with the status of the Western states as the ultimate goal, is evident (e.g. ibid, Ekenberg & Asker 1999).

Furthermore, the same rhetoric reveals a technological determinism underlying this approach. It is believed that technology is the key to progress and that a society's prosperity is dependent upon its appropriation of ICTs. Economically weak communities are encouraged, when not outspokenly ordered, to connect to the Information Society or the Networked Economy as rapidly as possible, in order to "unlock the tremendous potential that ICTs hold as a catalyst for development" and eventually "reap the gains", them too (Harvard Readinessguide 2001). "[T]here now exists a unique opportunity for many of these communities to join global information networks to propel them to greater wealth and prosperity" (ibid.).

The modernist development approach and technological determinism obviously go hand in hand, with both relying on the assumption that development is determined and following physical laws (although its pace can be manipulated with), while neglecting the notion from critical theory that all types of "progress" - be it economical or technical - function politically and involve social implications.

The Threats of the Dominant Approach

The dominant approach assumes without question that there exists such a thing as a mutual interest between different actors in society. "In order for their development potential to be realized" DOT Force (2001) maintains, "all stakeholders – governments and their citizens, business, international organizations, civil society groups and individuals – need to work together towards achieving real change". Striving to join together the needs of marginalized people with the aspirations of market-dependent institutions, its representatives typically neglect the unstable and political nature of the social world. Assuming, contrarily, that corporate interests may very well interfere with the visions of ordinary people, this approach instead poses a great threat to the interests of the latter category (which of course in itself too consists of different actors with differing interests). Further, there is an overwhelming risk that the politics of both development and technology are neglected as a cost of technological determinism. Focusing on the technology as such, ideological issues are being concealed, while their sometimes very serious social implications become regarded as given by nature, rather than results of a complex interplay between varying political interests. In the leapfrogging process that the economically weak countries are now envisioned to carry through, the dominant societies are ultimately considered the ideal and the technology of these societies is launched as the means to reach their blessed status. This foundation is not to

be questioned, which leaves the people of marginalized regions with no room to choose their own destiny, or for questions about whether some technologies – or all – might bring more harm than benefits. "Faced with an articulation of a new world order in which dominance is articulated in terms of advanced technology, developing countries are left with little recourse but to adjust accordingly" (Uimonen 2001).

THE ALTERNATIVE APPROACH

Socially minded grassroots organizations and pro-active NGO's have long been criticizing the simplicity of the digital-divide discourse and its exaggerated focus on access. These groups prefer to regard ICTs not as a blessed omni-remedy, bringing wonders wherever applied, but as a tool with a potential that may be released only if *used* in sound ways [e.g. Mistica/Camacho 2002]. Social issues, rather than economical ones are at the center of attention. While indeed acknowledging the need for access, representatives of the alternative approach emphasize that pure supply of ICT is not worth much without proper appropriation. It is typically argued that the application of ICTs in economically weak regions must take into account the social situation of the beneficiaries, so that they can benefit from the new technologies by using them in relevant ways. As an example, just installing a computer with an Internet connection in a rural village makes no difference as long as the people of the village do not know what to do with it. Helping the villagers to learn to retrieve information of importance to the community or teaching them how to set up a web page and market their locally grown coffee might be regarded as strategies for a socially relevant usage. Instead of economical efficiency and productivity, the primary goal is to find socially meaningful ways to use the new technologies, stressing for instance the importance of creating locally relevant contents. Although results may sometimes coincide, the alternative approach is concerned primarily with the viewpoint of the people of the communities in question, while the dominant approach, as argued above, essentially represent the interests of authorities and business.

Equitable Access

Alternative groups also tend to confront the issue of access on a more profound level than traditional ones. While the latter rely to a large extent on figures, such as the number of computers or Internet users a nation exhibits, the former seek to examine how access is actually distributed and appreciated in communities. Much like the Gross National Product of a country, so favored by economists to judge the success of a nations development, fails to appreciate the well-being or happiness of ordinary citizens, the percentage of a region's inhabitants connected to the Internet does not reveal how many people are actually benefiting from the Internet (Mistica/Camacho 2002). Neither does it say much about whether the people connected are accessing the technologies on equal terms; whether women have the same opportunities as men; whether ICT use is restricted to the wealthier classes; or whether minority groups are discriminated. Alternative forces therefore seek to develop different forms of assessment tools that are capable of investigating the actual distribution, type and appreciation of access.

The Bigger Picture

Occasionally do representatives of these alternative strivings include, or even highlight, the societal organization surrounding the technology, arguing that ICT alone, unaccompanied by structural social change, is not capable of bringing positive change to a society (cf. IDRC/Acceso 2001, Mistica/Camacho 2002). They are thus taking the discussion to another level and, besides usage, incorporating yet another social dimension of technology, namely that of the *political context* within which the technology is working and serving interests. This step makes a significant difference, as it incorporates a challenge of the belief, so

cherished in the dominant discourse, that new information technologies alone, whether somehow "wisely applied" or not, are able to subvert societal conditions that have emerged during centuries of economical and political development, including different stages of colonialism and globalization. The representative of this view might not be satisfied with a web page allowing rural people of low income regions to sell their coffee to the richer countries, but might beyond this be concerned about the wages of the workers, the toxic pesticides used at the plantations and even the unfair conditions of the economical system that dictates the rules of the coffee market. In short, "the digital divide is a result of the social divide" (ibid.) and the use of technology should be part of a greater strategy towards social change and equality and not viewed as an end in itself.

Some Limits of the Alternative Approach

Even taken into consideration the few forces conscious of the need for societal change beyond the introduction of new technology, some social dimensions of technology remain strikingly unexplored in the field of ICT-for-development. Alternative groups righteously put into question the technological determinism of the dominant discourse. This critique seldom manages to contest all problematic aspects of technological determinism, however. "The problem with technological determinism is that it leaves no space for human choice or intervention and, moreover, *absolves people from responsibility for the technologies they make and use*. This serves the interest of those responsible for developing new technologies [...]" (Henwood et al 2000:9-10, my italics). Often, only the first of these problems is addressed by challenging voices. In response to the dominant paradigm, the alternative approach, in its common forms, adopts what Henwood et Al calls the 'technology as neutral' view (ibid: 10), in which the *usage* of technology is emphasized. As a reaction to the technocratic attitude of dominant institutions, this is a welcome shift of focus – "the advantage of the 'technology as neutral' model is that it gives a prominent place to people, individually and in groups, making choices about how they want to use technological artifacts" (ibid.). But this model fails to take into proper account the processes that *precede* technological innovation, which are arguably struck by as much issues of social relevance as the ones following it. "'Technology as neutral' begins to create a space in which complex and usually conflict-ridden historical historical processes can be evolved. Investigation of that space, however, soon reveals that the processes by which technologies themselves are created are just as riven with choice and conflict as any other historical process" (ibid).

Even within alternative approaches, technology is commonly understood as a *tool*, ready to be used in different ways and for different purposes, while in itself free from social values. There is little recognition of what some call the *social embeddedness* of technology (Pfaffenberger 1992, Escobar 1994, Uimonen 2000) – the social values "built into", or associated with, technical artifacts and systems. "In contrast to other [non-technical social structures], people are prone to misperceive a society's technologies as inevitable, that is, as naturally determined rather than socially shaped and chosen" (Sclove 1995: 23). In appreciating different aspects of technology, most efforts therefore concentrate on how to handle its effects, and socially oriented strategies seek to reveal and prevent those effects that are regarded as negative social impact. Analyzing the social issues of the development, design and choice of technologies, and the ways in which these processes set the foundation for any type of effects, becomes a less prioritized concern, and as Escobar notes, "[...] more often than not, the purpose of technology assessment is not the reorientation of technologies but the adaptation of humans to the actual or potentially dangerous effects the assessment reveals" (Escobar 1994:211). Further, although most groups, traditional as well as alternative, by habit throw in the fashionable notion of "participation" into their strategies, few exhibit a deeper engagement in issues related to the actual *design process*, and even fewer adapt such an engagement to a specific information technology agenda, drawing, for example, from the extensive experience of the Participatory Design tradition.

Maybe most importantly, the alternative approach, although exploring alternative practices, has still to break free from some fundaments of traditional development thinking. The alternative approach fails to deliver its ICT agendas within the framework of a radical critique of the "discourse of development" (Escobar 1995) and do not consider satisfactorily, it may be argued, the political history that has constituted economically weak societies as "underdeveloped" (ibid.). When defining ICT strategies for these societies, alternative forces hesitate to recognize the historical and continuing role of dominant societies in perpetuating the conditions of marginalization, stressed by post-development and world-system theorists[6]. Consequently, ICT assessment efforts with origin in this approach risk neglecting the ideological role of technology in the development context, and therefore fail to develop a radical and oppositional technological agenda. Its representatives seldom give recognition to power struggles between different actors, specifically between members of marginalized communities and economical powers of the West, or development agencies working in their interest. These factors might help explain why ICT projects like that of AGRECO in Santa Catarina, Brazil, which builds upon farmers' resistance to economical globalization and the will to sustain a traditional livelihood (Ramos et al 2002), have so few counterparts. It may also provide an explanation to why the global network of people that assist the Zapatistas of Chiapas, Mexico in using ICTs to resist the neoliberal warfare on their people, is made up by radical political activists with computer skills, rather than alternatively minded ICT-for-development workers.

TRADITIONAL ASSESSMENT MODELS

Assessment models springing out of the dominant approach generally seek to appreciate the extent to which a community has "bridged the gap", adapted to the "network economy" and how its ICT efforts are being carried out in line with such aspirations (e.g. Harvard Readinessguide 2001). They typically focus on the dissemination of access, and secondly, on how this access is utilized in economically rational ways. As commented by Menou (2001), [m]ost of these instruments are fraught with an excessive, when not exclusive, focus on ICT infrastructure". Typically, in these types of assessment guides, different stages of adaptation or "readiness" are presented, against which a community can check itself. The lower stages relate well to the status of many marginalized regions, whereas the upper ones correspond with the circumstances in economically powerful countries. The idea of development as a series of stages, where Western society is the ideal, is thus explicit.

Most often, the modernist and technologically determinist perspective is evident. The authors of the "Harvard Readiness Guide" (an assessment model elaborated by Harvard University and the IBM corporation), begin by stating that "[e]lectronic commerce and related applications of information and communication technologies (ICTs) have become tremendous engines for economic growth and productivity and are changing the shape of the world in which we live". These opening words lay out the conceptual foundation for the guide, in flirting with technological determinism and declaring an uncritical adoption of the view that ICTs should be used in marginalized areas first and foremost to increase productivity and economic growth.

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[6] In this sense, the alternative approach to ICT-for-development resembles the broader trend of "Alternative development", whose efforts have in many ways been pioneering and containing important critique of the modernization paradigm, but failing to produce an alternative *to* development. From a critical point of view, "Alternative development" can in a sense be interpreted as not so much abandoning a way of thinking, as adjusting it according to a couple of new concepts (such as participation, sustainability, locality, et cetera).

Towards a critical approach

Socially minded grassroots organizations and pro-active NGOs have, as discussed earlier, been stressing social issues rather than economic and technical ones, and some of these have also sought to elaborate alternative assessment models accordingly. Efforts underway by grassroots groups, social movements, and such actors as the Olistica network appear as promising attempts to approach this task. It is to this development that the present study wishes to contribute. For such measures to form part of a cogent critical approach, it is argued here, there is reason to further elaborate a framework that is capable of dealing with development, as well as technology, and not least the relationship between the two, as complex and conflictual social processes.

A critical approach, as proposed in the following, builds on a profound critique of traditional development thinking and departs in a serious questioning of the ICT-for-development discourse. It attempts to build on the headway made by alternative forces, while extending concerns to include overlooked social dimensions of technology, and stressing the importance of the political context.

1b. SOCIAL DIMENSIONS OF TECHNOLOGY

A Model of Social Dimensions

Striving towards analyses that are capable of capturing the social and political implications of information technology, critically minded assessors must be able to examine issues that are typically neglected or concealed in mainstream discourse. Their analyses must have the capacity to put forward dimensions of technology that, if they are overlooked, help perpetuate specific power relations and social conditions. It is necessary, therefore, to delve deeper into the social dimensions of technology, focusing on "key aspects [...] that are rarely, if ever, voiced by computer manufacturers and political pundits" (Armitage 1999). In the previous section, it was discussed how different dimensions of technology, such as the design process and the social embeddedness, are treated, or neglected, by different approaches to technology in the development context. As an entry point for a continued discussion I will begin this section with a time/space graph (fig 1).
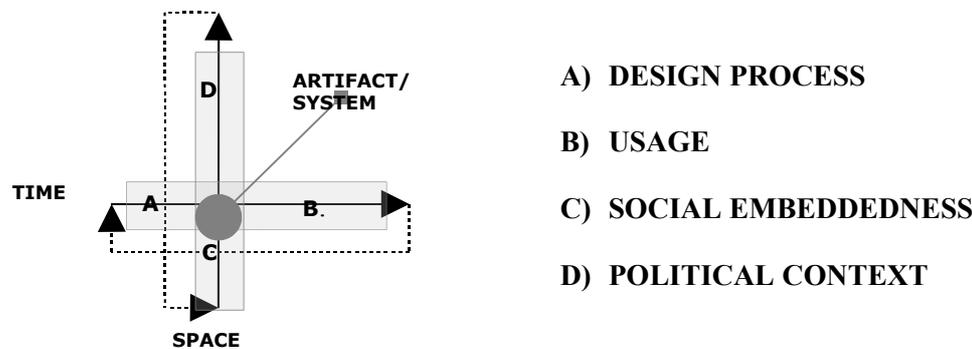

A) **DESIGN PROCESS**

B) **USAGE**

C) **SOCIAL EMBEDDEDNESS**

D) **POLITICAL CONTEXT**

Fig 1. Social Dimensions of technology through time/space axis

An explanation of this figure is appropriate. Starting out with the horizontal axis representing the flow of time, area A represents the processes directly *leading up* to the implementation of the artifact or system; the design process. Area B, then, illustrates the activities that follow the introduction of the artifact; its usage (including issues of access, maintenance and promotion, as well as the actual interaction between user and technology). Along the space axis, field C should be interpreted as the social values expressed in, and the behaviors implied or suggested by, the design of the artifact or system. Thus, although the figure might imply that this process is in some way or another outside of the actual artifact or system, it should rather be interpreted as lying "beneath its surface"[7]. The field D, finally, represents the social and political context, categorically surrounding and interacting with the technology[8].

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[7] In what way is the design process distinct from the social embeddedness? In the case of the design process, focus is directed at the social processes that precede the introduction of the artifact. The social embeddedness, while largely dependent on the design process, concentrates on how social meanings are expressed in the design of the artifact. The design process and the subsequent interaction between user and technology (when embeddedness is "delivered") are normally two different processes taking place in completely different social environments – not least in the ICT-for-development context, where technologies introduced in marginalized communities have typically been designed within the walls of wealthy Western institutions.

[8] The dotted arrows in the model serve to stress the fact that neither of the phenomena involved are finite processes with distinct starting and ending points. For example, the usage of an artifact helps form

To be sure, social dimensions of technology could be arranged graphically in many other fashions and not everyone would agree that the simplified diagram above is an appropriate model. Some would probably argue that it is misleading to split up the social dimensions in this way, as they are in reality inevitably intertwined. The objection is a plausible one, it goes without saying that the model does not reflect properly the unmodelable interrelatedness of the phenomena it tries to depict. Consequently, it should be regarded simply as a source for discussion. Its principal message is that a social assessment of technologies ought to encompass and address all of these dimensions. As noted earlier, particularly those issues related to the design of technologies have been overlooked in the ICT-for-Development discourse.

Political Context – A Social Dimension?

While it may be rewarding to discuss the design process, the social embeddedness and the usage of a given technology – although they are interrelated – as separate phenomena, the political context could not be distinguished as easily. Politics and ideology are permeating all dimensions of technology. The social values expressed in the design of an artifact, for example, can only have a meaning in the sociopolitical environment within which the artifact is introduced. As pointed out by Pfaffenberger (1992), "[a]n artifact's political affordances[9] are inherently susceptible to multiple interpretations. For this reason, an affordance cannot be sustained socially in the absence of symbolic discourse that regulates the interpretation". Likewise, the political context regulates the design process, determining its conditions and interpretations. The same goes, naturally, for the usage of technologies – the environment is crucial. The point of distinguishing the political context as a social dimension of technology is to highlight its importance and the need to incorporate ideological analysis into any critically minded assessment effort. In this text, the social embeddedness, the design process, and the usage will be treated as three different, but interrelated, fields of debate, while the notion of the political context will exist as a necessary background to prompt deeper, ideological reflection during the course of discussion.

Having introduced these concepts briefly, I will now discuss them separately and suggest ways in which critical traditions within each of these areas can help inform critical social assessment models.

IN THE TECHNOLOGY – SOCIAL EMBEDDEDNESS

A lot of people are used to discussing how citizens may exploit technologies to better achieve different ends. In the world of ICT-for-development, for instance, this is the center of discussion. We are not equally equipped, however, to debate the ways in which the technologies are "using us back". In which ways is the user shaped in her thoughts and actions by the way the ICT artifact has been designed? Why does one design come into existence instead of another, what consequences does that have for users, and which were the alternatives? These issues do generally not get a lot of attention although they are fundamental to our relationship to technology. Decisions on how technology should appear and function are normally made at levels of society far off from the average citizen/user (and in many cases they are not even formal decisions but only a process that some would readily label "progress"). This naturally causes people to take technology appearance and functioning for granted, as non value-laden aspects, focusing instead on what good *use* they

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the design process (of the same artifact in an iterative approach or of future artifacts otherwise) and, more importantly, the political context of any technology helps constitute the significance and interpretations of its social values. These issues will be discussed more extensively below.

[9] An 'affordance', is a visual clue to the functioning of an artifact

can make out of the technology, once it is there (Sclove 1995). Indeed, people do occasionally complain about misplaced buttons in a web page, but that is normally about as far as the debate goes. More seldom do we hear users ask why their computer interfaces look like typical Western desktops and call into question the social order that this fact might impose on them as technology users. It is not common either, outside of some academic circles, to reflect upon whether a certain design helps shaping the user into a compelling, or passive person, or if it contrarily contributes to independence, critical thought and action.

A technological system or artifact could be likened to a written text. And much like an article can carry with it and reproduce varying social values through its choice and use of language, its informational content and its undeclared presumptions, a technology, when introduced into a social context, may, through its design, convey ideological messages and prompt specific social behavior. "In this sense", declares Pfaffenberger (1992), one may speak legitimately of the political dimension of technological design: The technology is designed not only to perform a material function but also to express and coercively reinforce beliefs about the differential allocation of power, prestige, and wealth in society" (Pfaffenberger 1992). All technological artifacts and systems could hence be argued to be struck with what I in this text have chosen to refer to as "social embeddedness". Each given technological innovation can be thought of as carrying with it a conjunction of ideas and worldviews, "any technology represents a cultural invention, in the sense that it brings forth a world; it emerges out of particular cultural conditions and in turn help create new ones"(Escobar 1994).

Neutral Technology?

Continuing the article metaphor – just like many people think of news and science articles as providing objective information, technology is often thought of as having no internal political value. This notion of the neutrality of technology has been attacked and widely discussed by intellectuals during the second half of the 20th century (as have certainly the correspondent notion of objective science), and continues to be so today. Philosophers such as Heidegger and Marcuse (1991, 1999) argued fiercely that the "technological rationality" of modern society, and subsequently, the artifacts that it permeates, are political. "Technology", claims Marcuse (1999:39), "is a social process in which technics proper[...] is but a partial factor". A critical theory of technology, as proposed by Feenberg (2002) is thus "suspicious of the advantages the beneficiaries of technological advance derive from the claim that, like justice, technology is socially blind" (66). This view has been challenged by, among others, Habermas, who (very simplified) thinks of technological progress in terms of a project of humanity as such, rather than a struggle between different interests (Feenberg 1999: 150ff). Although this latter view, or some version of it, has become the popular understanding of technology, it has been confronted harshly by an array of social constructivist inspired scholars. Echoing Marcuse sixty years ago, they argue that "technological outcomes are not solutions to uniquely scientific and technical problems existing apart from social processes, but are instead negotiated social processes as thoroughly social as the outcomes of political campaigns located firmly in their cultural, political, and economic contexts" (Frohmann 1994). These thinkers certainly differ in their political ambitions, with many focusing more on the conditions under which different technologies were formed, and less on what implications the result actually bring to users and citizens (Winner 1993). What joins several of them together, though, is that they have moved from the abstract and sometimes essentialist philosophical level of their predecessors, to explore actual political properties of specific technologies. Many scholars have consequently dedicated themselves to explore how these processes actually function. For those interested in assessing social aspects of ICTs in economically weak regions, the space opened up by these academics is particularly relevant. Instead of commencing such assessment after the introduction of a specific technology and focusing on its usage and potential benefits, there is reason to put effort into analyzing the design of chosen technologies and its meaning for users and society in general, and further, to recognize the prospect of alternatives.

The Assembly Line

In what ways can a certain technological design solution contain political intentions and cause social implications? The classical example here is the assembly line, which serves to reveal both in what ways the social embeddedness is articulated and how it is the result of political conflicts. The assembly line increased management control of workers and production, at the same time as it made labor less autonomous and more monotonous than before. It also deskilled workers and extended labor division and thus increased working life alienation. Further, it replaced many tasks that had earlier been performed by humans, leaving workers unemployed and with a sense of being unnecessary. Some of these effects were obviously due to how the technology was used – if working days were reduced, the workers would not have to lose their jobs for example. Others, however, were more inherent to the technology – assembly line tasks would remain monotonous and deskilling irrespective of the social organization surrounding it. It could still be argued, though, that implications like these are nothing but side effects of a natural and more or less autonomous technological advancement. If this were so, the notion of social embeddedness would still be valid to some extent, but hardly very fruitful. The lesson that constructivist scholars who brings up this example want to teach, however, is that the assembly line, as well as all other technological innovations, were implemented due to specific historical, social and economical conditions and struggles, serving specific political interests, and that other designs would have been possible, biasing social implications towards other directions.

This interpretation of technological development allows for the examination of specific designs on political grounds and, moreover, for politically conscious elaborations of alternative technological solutions. In order to prove their point, these scholars direct attention to alternative workplace designs that have improved workers' self-determination and satisfaction, even without threatening efficiency goals of the management. The objective of the so-called Socio-technical school has indeed been to promote such alternative workplace designs, which increase workers autonomy, yet maintain, or even increase, productivity levels (Asaro 2000, Dahlbom & Mathiassen 1993). Other, more radical, thinkers envision what workplaces and technology could be like if economic efficiency was degraded from the top priority position that it has held in technological design in capitalist as well as authoritarian communist societies, and made way for other values, such as democracy, tradition, equality, ecological awareness, conviviality and cooperation (Sclove 1995, Ehn 1988, Feenberg 1999, Illich 1985).

Digital Battles

The assembly line may thus serve as an example in this discussion, of the notion that all technological artifacts have a political history and convey certain social implications. To be sure, this notion applies no less to the historically recent development of information technologies. "The capitalist genesis and design", Ehn argues (1988:99), "is all hidden in the technically objective rationality of the [computer] artifacts". Still, as has been pointed out by Pfaffenberger, the political history of the computer (or any other technological artifact) should not be understood as a determined, unidirectional, militant operation, carried out smoothly by capitalist interest. "To create the personal computer, for example, was not only to create new production processes and artifacts but also to bring computational power to the People, to deal the Establishment a wicked blow by usurping its own military-derived tools, and to restore the political autonomy of the household vis-à-vis the Corporation" (1992).

In similar ways, all technological development in the digital sphere can be interpreted in terms of conflict and struggle between different societal forces. The utmost symbol of the Informational Era, The Internet, started out as a military project but was formed into what it is today through the communicational desires and informal actions of ordinary citizens. "Users altered the design of [...] the Internet, through a posteriori interventions, adding human communication functions to systems that were originally destined to handle data" (Feenberg 1999:121). In software development, we can identify corresponding struggles. One

example is the rise of the operating system GNU/Linux. GNU/Linux differs from the dominating operating system, Microsoft's Windows, in some crucial regards. First, its source code is open, enabling users to understand how and why the system works and secondly, all users are free to participate in its development, increasing user autonomy. On top of this, the system is distributed for free. By these simple means, GNU/Linux challenges three of the cornerstones of capitalist society (the idea of intellectual property rights, the encouraging of competition rather than collaboration and the rule of the market forces[10]. The digital foundation of informational technology is in itself a source of political conflict. The copiability of digital artifacts is one of the main contributors to the economical success of various software and media corporations, yet at the same time posing a great threat to their existence. The emergence of file sharing networks such as Napster and Kazaa – who exploit the copiability of information technology to the benefit of the user, rather than the manufacturer – enables participants across the globe to reproduce eachother's files at no cost, and with no quality-loss whatsoever. These types of activities, while seldom explicitly political, are in deep interference with some of the cornerstones of capitalist society, such as the concepts of intellectual property and private ownership.

Nick-Dyer Witheford concludes this standpoint of technology as political conflict as follows (1999:72):

> *"Thus, for example, automating machinery can be understood as imprinted with the capitalist's drive to deskill and control workers, and also with labour's desire for freedom from work - to which capital must respond by technological advance. Similarly, communication technologies have often - as in the case of radio and computer networks - evolved in the course of very complex interaction between business drive to extend commodification and democratic aspirations for free and universal communication. Along the way communication technologies have been shaped by both forces. This is not to say that technologies are neutral, but rather that they are often constituted by contending pressures that implant in them contradictory potentialities; which of these are realized is something that will be determined only in further struggle and conflict"*

Flexibility and Bias

What we arrive at from these accounts is that technology is developed through conflictual processes, and that the final design of a technology becomes the platform for continuing struggle, in which the design as such supports or suppresses different, essentially political, objectives. Since every technological design has been achieved through conflict, and since each design needs a social environment to function in, a certain technology is never capable of carrying through a specific political agenda on its own. Rather, "[t]he ideologies crafted in the course of technological innovation are inherently ambiguous and susceptible to multiple interpretations [...]" (Pfaffenberger 1992). Constructivist theorists refer to this as the "interpretive flexibility" of a technology (following Bijker et al 1987). In computer software we find a telling example of this in the phenomenon of open source[11], a concept that has now been embraced by programmers, anti-capitalist political activists and business alike – each with their own motives.

Without denying the interpretive flexibility of technologies, this concept should not lead us back to the idea of technologies as "neutral". As asserted by Sclove (1995:17-18): "There is always a margin of flexibility in how existing technologies may be used or operated, or in what activities may occur in conjunction with them [but] a technology's greatest flexibility exists before its final deployment, when artifacts and their accompanying social organization are being conceived and designed". Thus, as argued by Ehn, *"emancipatory practice must not*

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[10] What makes the whole situation *really* frustrating for the Microsoft corporation is the fact that GNU/Linux in many respects has shown to yield "better" [in terms of economical efficiency, that is] results than Windows

[11] This concept is discussed further below.

only aim at changing the use of artifacts but also their technical design [...]' (1999: 100). A critical assessment approach must too be informed by this insight, and seek to reveal the ways in which different designs are predisposed towards certain socio-political directions.

Social Embeddedness & Marginalized Regions

What use can we make of this theoretical discussion on social embeddedness in the assessment of ICT efforts in economically weak regions? Just like intellectual debates on society and technology have concerned, on one hand, technology as such (the subject preferred by philosophers), and on the other, the social aspects of specific technological designs (investigated primarily by scholars of Science, Technology and Society studies), there might be reason to divide a technology critique in the development context along similar lines. Technology in general, and recent years' media and information technology in particular, can be analyzed on terms of its broad cultural and societal implications. Since research and development of these technologies primarily takes part in the economically powerful regions of the world, the cultural messages and structures they bring forward when introduced in different geographical and societal environments is naturally of particular interest. Philosophers like Marcuse, Ellul and Heidegger revealed some social dimensions of the technocratization of industrialized society. In the case of economically weak regions where Western technology has been introduced, contrasts are sharper, implications more easily observed and there is no doubt that this space of investigation deserves more attention that it has been given to date. An awareness of the role of technology in the global modernization project and in the strengthening of certain forces and cultures in broader societal development is essential for critically minded actors. This awareness must exist as a background for different types of critical activities and strategies. When it comes to the assessment of specific ICT endeavors however – the subject of this study – focus must naturally be on the properties of particular technologies, rather than an analysis of (Western) technology as such.

The open source concept introduced above is certainly a good place to start. It is widely known that Microsoft has begun to donate their proprietary software on a large scale to institutions in economically weak regions. In this way the corporation is evidently suppressing the potential of alternative, free and non-proprietary software[12], and at the same time creating a dependence upon their own software, for which licenses are not seldom limited in time. The most obvious advantage of free software compared to proprietary one, in economically weak regions, is of course the fact that it is predominantly distributed gratis. But which are the social implications, in terms of embeddedness, rather than pure economics, of the choice of proprietary software for users and their communities? What kind of meanings, values and behavior does proprietary software deliver and support? And in what way does open, or free, software provide an alternative?

In the famous words of the founder of the Free Software Foundation, to understand the concept of free software, one must think of "'free' as in 'free speech', not as in 'free beer'"[13]. The basic principle is that the code of any computer program (basically its "architecture") should be freely available to its users, for better understanding, revision and even modification. This concept enables users to actively take part in their technical environment, and even participating in its construction. Proprietary software as such, on the other hand, counteracts such participation. Apart from the immediate consequences of these principles, they may also be argued to represent different worldviews, which they bring forward to their users. Proprietary software builds upon the assumptions of the dominant economical model, relying heavily on intellectual property and competition. Free software confronts those assumptions, building on community ownership and encouraging collaboration. These issues

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[12] Indeed, Microsoft did not start donating licenses to economically weak regions on a grand scale until a couple of years ago, when the menace of no-charge software, such as GNU/Linux and Star Office became obvious

[13] http://www.fsf.org/philosophy/free-sw.html

can certainly be argued to make an important difference for citizens of marginalized regions in defining their ICT strategies. If collaboration, auto-determinism, and the creation of a technological environment specifically developed by and adapted to the needs and wishes of communities are judged as being desirable objectives, then certainly free software provides some favorable attributes that proprietary software does not.

Proprietary versus free software serves well as an example of the social embeddedness of technology and its relevance in the development context, but is of course not the only issue worth investigation. In similar ways, all technologies, envisioned and implemented, should be examined according to the kind of usage they allow, the behaviors they prompt and the social values they uphold or confront. And not only the actual information technologies should be susceptible to investigation of social embeddedness. One electricity solution may be more sustainable from an ecological point of view than another one, thus affecting the world of citizens and expressing an environmental concern. Manuals and other types of information and instruction accompanying the technology are also assisting in articulating the values of the technology. If a computer program is launched in a Spanish-speaking community with manuals in English only, this obviously entails social implications. Sites chosen for ICT projects, buildings and architecture, organization of user environments such as compilation, placement and setting out of equipment, all carry with them social meanings and prompt reactions with their users. Even the human organization surrounding the ICT practice ought to be considered when assessing social embeddedness. Work hierarchies in ICT projects, "rules of conduct", opening hours et cetera, all help constituting the meaning of the technology in the social world.

Concludingly, when assessing ICT in economically weak regions from a critical social viewpoint, the social embeddedness of technology should be regarded as an essential focus of attention. Investigators should examine the design attributes of technologies used or proposed and seek to relate these attributes to ongoing political conflicts. They should investigate the meanings, values and impact that the social embeddedness of technology has and can have, for beneficiaries, and they should direct attention to alternative solutions. Of particular concern for the critically minded assessor might be in what ways technologies promote, for instance, activity or passivity; creativity or monotony; autonomy or dependence; critical thought or compliance; collaboration or competition; democracy or hierarchy. In the development context, the findings of such evaluations should be measured against the aspirations of the people that are supposed to benefit from the technologies. In what ways are the design and the visions it is meant to promote interfering with the values, traditions and interests of community members and marginalized people in general? It must also be acknowledged that one and the same technology may be interpreted and treated differently by different groups. Women, for instance, may experience difficulties with technologies that were designed in line with a male understanding of the world[14]. The promoters, owners or managers of an ICT effort may have a thoroughly different perspective of the ICTs than users (and non-users) and subsequently be susceptible to other types of effects of their design. The critical investigator should pay specific attention to how marginalized groups are affected socially by the design of technologies but also compare this conception with the meaning of the same technology for people in more powerful positions.

There is, of course, no simple way to measure these values, and appreciations will always depend on the persons making the analyses. Standardized models will never be satisfactory in this regard, although further discussion and experience may certainly allow a better understanding and common grounds to work from to evolve. The principal message is that

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[14] In order to clarify this notion; it is the conviction of this author that such differences in mens' and women's worldviews are socially constructed, rather than essential to their biological properties. They nevertheless exist and affect our experiences. Not all men or all women share the exact same worldview, of course, but due to the significance of gender in most societies, differing perspectives and interests may be distinguished between women as a group and men as a group.

the social embeddedness of technologies be taken seriously and dedicated extended reflection in any social assessment of technology in marginalized regions.

BEFORE THE TECHNOLOGY – THE DESIGN PROCESS

Marcuse, unlike Heidegger and Jaques Ellul (who were both quite pessimistic about technology as such) actually imagined the prospect of an alternative technological rationality, developing in the interest of the people, rather than administration, or "the apparatus" (Marcuse 1991, 1999). In fact, he envisioned such an emancipatory technological development to emerge in the marginalized countries of the world, given that the inhabitants of these countries resisted the "industrialization and the introduction of technology" in order for a progress of their own to emerge, based on "traditional modes on life and labor" (Marcuse 1991:47). Other scholars have launched similar visions, in line with the critical social tradition's questioning of the principles of industrial society and notions of autonomy and emancipation for the people of marginalized regions. Caribbean dependency theorists, for example, have advocated the emergence of "an indigenously oriented technology", growing out of a break with capitalist organization of society and economic and political self-reliance (Servaes 1999: 82). A critical approach might not have to reject Western technology altogether, as Marcuse implies, but the vision of an alternative technological reality, springing out of other cultural contexts than that of Western capitalism, is without doubt tempting for a critical mind. What is certain is that in order to accomplish a technological development on the terms of marginalized people and their situation, critically minded actors must take seriously the design process and the social issues that this process embodies.

The design process is a blatantly neglected area in the field of ICT-for-development. Yet it is decisive for the outcome of any ICT project and the way it is carried out is a forecast of how different people will perceive the technology and their own relationship to it. During the design process, the principles and visions of a technology are materialized (or embedded) into an actual artifact or system. From a social point of view, this process contains many critical issues, as for instance what types of knowledge and information are informing the design work, who is allowed to participate in the creation of the technology and on what terms. The design process is not just a technical matter of creating an efficacious and satisfactory system, but also a political and ethical matter about democracy, autonomy and the right to take part in and contribute to the construction of society.

The concept of "participation" is today evident in virtually all development strategies, produced by various kinds of institutions with seemingly differing agendas. What started as a part of a forceful critique of the hierarchical and enforced nature of traditional development efforts is today seldom more than an empty word, adopted by development agencies that, in spite of a new vocabulary, remain essentially modernist. Indeed, Richard Heeks (1999) has labelled this order "the tyranny of participation", pointing out that "participation is often undertaken without considering the political and cultural context within which it seeks to take place" (ibid). In development projects related to ICT, the superficiality of the concept is evident in the general incapacity of such projects to build upon specific community interest and knowledge, and furthermore, in their failure to learn from the extensive experience of the Participatory Design tradition, which provides a theoretical as well as a practical framework for a democratization of the design process. Today, virtually all ICTs are developed and financed in economically powerful regions (and manufactured in "semiperiphery" countries like Malaysia and Costa Rica). And "although the number of women using ICT for information search and for communication is increasing, the number of women involved in research and development of these technologies, whether on the hardware side or on the software side, is still depressingly low" (Dahms & Ramos 2002). In the ICT world, ideas and concepts, definitions of needs and strategies, the understanding of the role of technology in

society – all spring out of (masculine) Western culture. The prospect of creating an "indigenous technology", as envisioned by Marcuse or Caribbean scholars, seems far-fetched when only Western knowledge is counted and citizens of marginalized regions are denied entrance into the design process.

Local & quotidian knowledge

One point to which attention must be drawn when one is considering ICT in development, argues Dahms & Ramos (2002) is that "knowledge does exist in all societies, even if often as tacit and non-formalized knowledge, and [that] the development process must acknowledge and take its point of departure in this existing knowledge". In the typical ICT-for-development case, however, this is seldom the case (ibid, Avgerou 2000). Non-Western communities are conceived as "know-nots", underdeveloped and in need of Western structures, know-how and infrastructure. Computers and Internet access are provided not as a means to strengthen traditional livelihood and local knowledge, but as an important and very symbolic step on the road to "modernity", along which non-dominant truths and knowledge are discarded. The Information Society discourse reinforces this practice in launching categories like "information-rich" and "information-poor", which, correlated with technology, deny "the validity of the different types of knowledge that people possess, much of which is transmitted by other means than those of advanced digital technologies" (Uimonen 2001).

Many ICT projects in marginalized regions are "solutions in search for an application". They are developed before, or without, letting the designers interact with community members in specifying needs and aspirations of the community. Telecenters and school technology labs are developed as generic ICT-medicine, thought to be able to resolve any type of problem (Benjamin & Dahms 2001). Moreover, they are typically carried out by representatives of governments and business who fail to recognize political conflicts between these institutions and the members of the communities they aim to "develop". The classical modernization thinking, based on scientific knowledge and the application of one and the same (Western) model on all societies, is here strengthened by the Information Society discourse and its belief in the transformational capabilities of technology, into a powerful, but menacing, agenda for marginalized parts of the world. Even without questioning the intentions behind such strategies, it is evident from a critical point of view that such endeavors do not increase self-determination or encourage people to seek their own solutions, based upon their own situation, knowledge and worldview. They follow the pattern of conventional, ("Cartesian", or "hard") ICT development, which is based on established science, routine and mechanistic prediction (Dahlbom & Mathiassen 1993), rather than political insight, actual situations and the experiences and viewpoints of users and community members.

"In opposition to the Cartesian approach which dominates computer science and systems design today", Ehn (1988:122) argues that "human practice and understanding in everyday life should be taken as the ontological and epistemological point of departure in inquiries into design and use of computer artifacts". If autonomy, emancipation, and the release from dependence upon economically powerful regions are appreciated as desirable objectives, then ICT efforts, instead of providing off-the-shelf, "one-size-fits-all" technological formulas, must depart in and build upon traditional, and quotidian, knowledge and strive to invigorate locally developed means of subsistence. Given that equality too is a concern, they should further seek to include the viewpoints of community members whose voices are seldom heard, such as (depending, of course, on the community in question) women, ethnified minorities and disabled citizens.

Those interested in assessing ICT efforts from a critical social viewpoint should hence investigate the tendency of a project, envisioned or realized, to build upon local knowledge and tradition, and the viewpoints of discriminated citizens. The extent to which this is done during the design process reflects the political worldview underlying any ICT effort; the view

of knowledge, of economically weak communities, powerful ones, and the relationship between them.

Participatory Design

One of the most potent strategies that have been presented to bias technological outcome towards the interest of its future users is to involve them in its design phase. This idea has been one of the bearing principles behind the development of the Participatory Design tradition. Participatory Design can be argued to have several origins but its most widely recognized academical roots can be traced to Scandinavian collaborations between computer scientists and labor unions during the 1960's and 70's (Asaro 2000). In research and development, the designers, who were not seldom Marxist influenced, made common cause with industrial workers meant to use the computer systems, rather than with management. By involving the future users of a computer system in its design, it was argued, the system could be developed to meet the needs of the workers, such as workplace democracy and self-realization, instead of only the economical incentives of the management, which tended to result in monotonous work tasks, hierarchical division of labor, and deskilling of the workers. In North America, participative design methods were experimented with for other reasons. Business strategists realized the potential of involving users in the design process, as a way to create more satisfactory, and thus marketable, systems (ibid). Later, the Scandinavian tradition left its politically radical connotations and joined forces with the British socio-technical school, which, as discussed in an earlier section, "while striving towards workplace 'humanization', did not contain a confrontation with management objectives of efficiency and productivity"(ibid). Today, Participatory Design is no longer concerned exclusively with workplace technology as the concept has been adopted by more types of designers, even by some architects and artists. Participatory Design has thus grown to embrace a wide array of actors who are all interested in an active involvement by users in the design process, but for different reasons[15].

Participatory Design of information technology can thus be promoted for reasons of product quality, production efficiency and (subsequently) profit maximization (Asaro 2000), it can be adopted with the object of increasing work (or leisure) satisfaction – either in an attempt to join together the interests of management/producers and workers/users, as in the socio-technical approach, or as a strategy of workers' (or users') rights struggle (Bjerknes et al 1987, Ehn 1988) – and it can further form part of a general vision of democratization, with the argument that people should have the right to take part in the construction of the society they live in (Ehn 1988, Winner 1995, Dahms & Ramos 2002, Sclove 1995). Sclove, representing this latter view, argues that: "If citizens ought to be empowered to participate in determining their society's basic structure, and technologies are an important species of social structure, it follows that technological design [...] should be democratized" (ibid:27). Based particularly on this notion of participation in the design process as a democratic social right, and its potential for increasing autonomy, self-actualization, and collaboration, "emancipatory" Participatory Design has also been proposed as a way for critical theory to approach technology (Asaro 2000). For a critical approach to ICT in marginalized regions, Participatory Design should be discussed primarily on these grounds, although arguments about higher efficacy may under any circumstances certainly serve to strengthen the argument for adopting these principles in economically weak regions.

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[15] This development could certainly be called into question. While their pioneering predecessors engaged in a critical endeavor to confront management power in the workplaces, many representatives of the Participatory Design approach today try to avoid choosing sides – a choice which categorically favors the dominant force. From a critical point of view, there is definitely a need to re-politicize Participatory Design. If nothing else, the development of the approach at least serves to demonstrate the manifold incentives for adopting it. Indeed, as Ehn (1988:172) mentions, "[t]he different motives and arguments for participation come in every shade from a political or ideological one, to an utterly pragmatic one".

In marginalized regions, the case for using Participatory Design methods might be particularly strong, especially from a critical, or "post-development" point of view, which suggest the emancipation of marginalized regions from the dependence upon Western economical forces and acknowledges the right of the inhabitants of these regions to define their own solutions (and problems for that matter) instead of having ready-made models and accompanying technologies forced upon them (cf. Rahnema & Bawtree 1997). Participation in the design process is of course no guarantee for social transformation, but within a broader strategy towards political change, user participation can allow for people of marginalized regions to become the actual authors of such transformation. Participation in the creation of technologies may be a crucial step towards a society that takes serious the political nature of technologies. In the vision of Langdon Winner (1995: 81-82):

> "At a time in which politics and technology are thoroughly interwoven, perhaps a [...] definition of the virtue of citizens is that they know both how to participate in the shaping of technologies of various kinds and how to accept the shaping force that these technologies will eventually impose.[...][T]he creation of new spaces and roles for technological choice might lead us to affirm a missing feature in modern citizenship: the freedom experienced in communities where making things and taking action are one and the same." (Winner 1995:81-2).

Participation – How?

Participation in technological development need not, and should not, be limited to occasional user consultations. Users may be actively involved in the design process. Indeed, experiences have shown, that even in the context of marginalized regions, such involvement may in fact include participation in the design of computer hardware. In a recent project in Laos, the fishermen supposed to be the future users participated in creating a low-electricity computer, adapted to the circumstances of their communities and running on an equally locally developed version of GNU/Linux; Laonux[16]. Indians have developed a "Simputer", designed according to needs of Indian users, and the "PC Personal" is a Brazilian equivalent". These are just some examples of how the process of developing ICTs can be opened up to engage users in the construction of their technological environment, thus both alleviating dependence upon alien producers and adapting the technology to local demands. Sadly, few projects in marginalized regions adopt the principles of Participatory Design. Some path breaking experiences exist, however. One attempt to develop a computer-mediated information system in a rural and economically weak region, used the following fundamental criteria for the design process (Ramos et al 2002):

> "[u]sers should be capable of making effective decisions about the role of technology in their activity. This requires that the specialists be capable of using, in the analysis and specification phase, representation systems capable of being understood by the community. Moreover, it requires that the communities affected by the use of technological devices have the right to say if they want their implementation or not"

Fulfilling these types of demands may certainly be a challenging task in marginalized areas, where designers may be confronted with future users that have never before seen or used, let alone designed, digital artifacts. But as the mentioned project has proven, finding ways is far from impossible.

The criteria quoted are some basic principles for a participatory approach to the design process. In practice, a participative design process may include, among other methods, the use of ethnographical studies, workshops (where ideas are discussed and elaborated), and prototypes and mock-ups (which allows for the users to contribute to the design process in its different phases). It typically treats the design of the technical system as an iterative process, where evaluations and experience continuously inform further development. This philosophy stands in contrast to the traditional model, which regards the design phase as a finite process

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[16] see http://www.jhai.org/jhai_remoteIT.html

with a distinct delivery point, which corresponds with the final implementation of the technological system (Dahlbom & Mathiassen 1993).

As argued in the section on social embeddedness, materials such as manuals can be understood as a being a part of the technical system. In the same way, the training for the use of the technology could be interpreted as one of its vital parts. Subsequently, it could be argued that the development of manuals, as well as the modes of education (including pedagogy, schedules, contents and structure of classes), and other types of "discourse" creation should be subject to user participation in the same way as artifact design. Basically, for projects to evolve on the terms of marginalized people, the principles of Participatory Design should guide all phases, technical and non-technical, of any community project. But while participation in development projects has become a recognized ambition by most development agencies since several years, participation in the design of technical systems – particularly in marginalized regions – still remains a widely unexplored area.

Socially minded assessors ought to look closely at participation in the design process. Are users taking part in the planning of the project? Are they involved at all in the design work? If they are, how is their participation assisted? Are efforts made to facilitate users' understanding of project plans and requirements specifications? Do community members have the right to turn down suggested technological implementations? If participation in the creation of a society's basic structures is conceived as a fundamental social right, these and more questions must be investigated.

Critical Issues in Participatory Design

Participatory Design is unfortunately not as easy as deciding to include some unidentified concept of "users" into the design work. Who are the users, for example, and on what terms should they participate in the design? Further, from a critical social point of view, user involvement is of less value in the absence of political insight and without forming part of broader strategies towards social change. Critical social assessment of ICT efforts in marginalized regions, therefore, must go beyond answering 'yes' or 'no' to the question "Are users involved in the process?". Several issues need to be examined further in order to achieve an understanding of the meaning of participation in specific projects. Richard Heeks (1999a) has directed attention to some of these issues in an attempt to overcome the "tyranny of participation" and reach a "critical approach to participation in [information system] projects".

First of all, participation can mean a lot of things; "one can participate in providing information; in decision making; in implementation of decisions; and in evaluation of those implemented decisions" (ibid.). To which of these processes users are allowed or denied entrance is naturally a crucial question. If participation exists only in the evaluation phase, while the creative elements of the design process are reserved for "experts", vital social aspects of the Participatory Design approach, such as self-realization, are being lost. Contrariwise, if users are not allowed to contribute to the maintenance, evaluation and modification of a technology once it has been implemented, their actual autonomy will be limited. It is therefore crucial to investigate which parts of an ICT project are actually open for user participation.

A further important issue is who the persons are that are allowed to join in on those phases of the project that are open for participation. As Heeks (ibid.) points out, "[m]embership is often skewed towards the powerful and away from the marginalized". Even when community members are invited to take part in the realization of a development project, those persons tend to be selected that already share the perspectives of the, normally alien, project initiators or are willing to adapt to them. An individual who is opposed to or deeply critical about a development project is not likely to participate in its realization. Likewise, people who feel that they have nothing to contribute with or that their opinions are worthless for the project

will most likely stay out of the design process. Groups of people whose knowledge and interests are culturally and historically suppressed often underestimate their own capacities (ibid.). This may include women in most situations, workers in industrial development and end-users in ICT design projects. Chances are that representatives of such groups will deliberately stay out of participation, and moreover, that the project leaders will not put much effort into encouraging them. A critical approach should struggle to include marginalized groups in the design process. Allying with the people of the communities, at the expense of Western technology manufacturers or external project managers, might stand to reason, but even within communities, those members whose voices are seldom heard should be identified and represented. The constellation of participants is an important theme for social assessments. Which groups are allowed participation? Is the representation challenging existing power relation or not?

Even if user participation has been guaranteed in processes that are judged important, and marginalized community members have been ensured inclusion, the social context within which this participation is being carried out may impose serious limitations on its actual value for participants. "In particular, there are clear cases in development contexts where participation is not participation: where the culture and politics of an organization prevent apparently participative processes from producing truly participative outcomes by constraining who can say what and how within any kind of group activity" (ibid). In every project situation there are dominant actors and less powerful, or "oppressed" ones. The former ones typically have the privilege to define – implicitly, more often than explicitly – the underlying foundation of the project, what is "good" and not, what counts as knowledge et cetera. In the development context, this is particularly evident, where the expertise of external project members, representing authorities or foreign aid agencies, who "know about development", is seldom questioned. The same principle is often apparent in ICT projects in general, as users fail to appreciate their own experiences and opinions as valuable, and deliberately hand over decision-making to the computer experts, even within a participatory project organization[17]. Thus, a critical evaluation cannot be content with participation as such but must delve deeper into the social organization that surrounds it and analyze the power relations that sets its foundation. In assessing ICT efforts, critical investigators should strive to reveal whether and how participation, given that it exists at all, actually enforces those voices that are commonly suppressed, in specific situations as well as in society in general.

Another phenomenon to be attentive of is "cosmetic participation". As the "new mantra" in development, participation "is often introduced in a top down, blueprint manner" and "[t]his may preclude true participation" (ibid.). Participation can be used as an alibi for acceptance. Since community members are participating in a project, project leaders may argue, external opposition to the project is futile and, moreover, failures can be blamed on the community, rather than management. Further, when being launched in a forced and superficial way, participation may even set aside other forms of traditional democratic decision-making, with which community members feel more comfortable. In the words of Heeks (ibid.), "[t]op-down, bureaucratic participation may impose rigid formal structures on pre-existing flexible informal truly participative structures, thereby submerging the latter". Once again, this is particularly probable in the development context, where external facilitators often fail to appreciate existing, traditional ways of organizing society. A social assessment of ICT efforts in marginalized regions should therefore be attentive to traditional community structures for decision-making that project strategies, including participatory ones, are running over.

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[17] This fact was realized by pioneering Participatory Design practitioners who experienced "a lack of appreciation by workers for their own knowledge of what they do" and further, "a reluctance among technical experts to give project control to users, as this threatened their technical authority and traditional work practices" (Asaro 2000). In the same way, certain categories of people generally tend to experience difficulties in bringing forward their own realities and viewpoints in situations with other actors that represent dominant perspectives. Women, ethnified and disabled groups commonly experience such subjugation of their own knowledge. Participation per se does not eradicate such, socially established, power relations (Heeks 1999a).

The Role of the Designer

Ehn (1988: 100) has argued that "A science of design and use of computer artifacts that has no theory for understanding the social and historical character of what is studied may have seen the technical side of the artifacts but not really understood it". An ICT developer will always be carrying out her work in the midst of political struggles for power. This is true of any development project, formal or informal, in a Western commercial factory plant or in a rural African School. For those who work with the design and implementation of technological systems, this awareness is crucial. In the typical case, however, the ICT designer does not recognize herself as a political actor (Dahlbom & Mathiassen 1993, Avgerou 2000). In development projects, for instance, the role of the designer is typically to design a technical system according to the development goals defined by her client organization. Her work is conceived as a scientific, technical and objective means to bring "development" – which is considered beneficial for all stakeholders – to a community. She seeks the most rational and effective way to deliver a technical system according to the requirements of the specification she receives, without questioning or politicizing its contents and objectives. In an alternative approach, this is exactly what the designers have to do.

Taking seriously the politics of their work, they cannot regard themselves as technical experts only, whose aim is to deliver the "best" technological solution to a defined problem. Instead, designers must see themselves as political agents and *interventionists*, responsible of realizing a social change in the users' reality, a change that perpetuates or confronts existing power relations (Dahlbom & Mathiassen 1993). In this process, they must identify differing interests, they must seek to bring power struggles to the surface and they must be ready to take a stance in these conflicts. "The political agent cannot say 'good' without asking, good for whom? The evaluation of computers in use is always relative to one or another interest." (ibid. 183)". A politically conscious designer is clear about whose interests she seeks to support when developing ICT systems. In the case of a critically minded practitioner, the allies are likely to be the marginalized, neglected or oppressed people in the social environment where the system will be used.

Changed perspectives mean changed practice. Avgerou (2000) argues that "[m]ost information systems professionals, indoctrinated in the rationality of modernity, have little capacity to recognize the clashes of rationality they encounter when they strive to emulate the effects that ICT has 'enabled' in the Western economies in the context of developing countries" (ibid.). An effort to work within a truly participative and emancipatory framework calls for computer professionals to redefine their professional role and the relationship between themselves and the future users. "The systems developer is no longer an expert solving the problems of other people. The problem owners and users are themselves active and responsible participants in the process. The users have become designers, and the task of the systems developer is to facilitate learning and give technical advice" (Dahlbom & Mathiassen 1993: 119). The designer possesses some technical knowledge that the future users are not likely to have. Her technical skills are no doubt invaluable in the design process, but this professional expertise of hers also threatens to be an obstacle to interpreting and envisioning the technology in alternative ways. At the same time, community members have knowledge, information and aspirations that are probably not shared by the designer, but upon which the technical system is supposed to be built. These circumstances demand a process of learning from both sides – "[...]user participation changes the design and development process into an evolutionary process of mutual learning and co-operation between designers and users about technical possibilities and useful deployment of these possibilities" (Dahms & Ramos 2002).

Summarizing the emancipatory design approach in the words of Ehn (1988: 94-95), it has to be "integrated theoretically into a context of social and historical knowledge, and practically in a strategy for emancipation based on reflection and practical change by and with those concerned". To achieve this, Ehn, inspired by Freire, suggests a process of *conscientization*,

where designers and users spend time and share everyday life and together develop a social and historical perspective on the task in order to eventually find ways of action (ibid: 93-4).

It follows that a critical social assessment of ICT efforts in marginalized regions has to be attentive to the role of the designers in such endeavors. Are the designers working primarily as technical experts or do they recognize the political character of their work? Does the design team dedicate a considerable amount of time to interact with community members and share their everyday life? Are the designers functioning as technical facilitators in a process that is driven by the community members themselves, or is their technical expertise permitted to steer the project according to their own understanding of the problem?

AFTER THE TECHNOLOGY – THE USAGE

The fact that most people, including those representing alternative agendas, almost excludingly focus on ICT usage while neglecting design issues of social relevance should not be blamed solely on ignorance. Investigators, users and average citizens do not typically have the power (in terms of finances, knowledge and societal positions) to alter the circumstances of ownership, design processes and technological outcomes. It is therefore natural to focus on how to best exploit those artifacts that are, under the given circumstances. Although it has been argued in this text that an analysis of ICT usage must be combined with evaluations of the design – both as product and as process – in order to achieve a thorough understanding of the social aspects of ICT initiatives, the actual utilization of a technology naturally remain a vital social ingredient in any ICT experience. In this last section of the theoretical discussion, I will draw attention to some aspects of ICT usage that should be of relevance for attempts to assess ICT efforts from a critical social viewpoint. Compared to the design phase and the social embeddedness of technologies, these matters have not been neglected to the same extent. In this section, I will therefore build largely on the headway made by progressive forces dedicated to this area, most notably the "social vision" elaborated by the Mistica network (Mistica/Camacho 2001).

Equitable Access

Once access (to whatever it is that shall be accessed) is judged desirable – a decision that should be preceded by comprehensive discussion by the people affected – laying out the cables will not be the only preoccupation. Given that equality is a concern, efforts must be made so that no person who is interested in using the technology should be excluded from doing so. This might seem like a predominantly financial or technical matter and to a certain extent it is, of course. If access costs money and some people cannot afford the fees, there is certainly an equity problem and any social assessment should be attentive of such limits to equal access. At the same time, people may very well benefit from a technology without having immediate access to it (Mistica/Camacho 2002). Even if a project has the technical means and the economical capacity to guarantee technical access for everyone, however, a couple of barriers may remain. Culture, language difficulties and educational issues may stand in the way for truly equal access (ibid.). A citizen that gains access to an ICT service only to be met by instructions in a language she does not handle will have serious trouble benefiting from the service. In a society characterized by racism, minority groups might avoid using a telecenter if its workers and the majority of users represent the dominant group, not because they are formally unwanted, but because they would feel uncomfortable in that environment or because they would experience the project as "belonging to them". Likewise, women might be reluctant to approach technology for the same reasons, or simply because technology is traditionally associated with men and male activities (Dahms & Ramos 2002). Efforts to undermine such culturally created inequalities will seldom be successful if measures taken within the boundaries of the actual ICT project are not forming part of broader political agendas to counteract social discrimination. Assessing ICT initiatives from

a social viewpoint involves an appreciation of how access is distributed in a community, of the economical, technical and cultural circumstances that prevents equal access and of the strategies used to reduce inequality.

As stressed by members of the Mistica forum (Mistica/Camacho 2002), investigators should not only look at the extent to which access is distributed among different groups in society but also at how this is done. Access must include not only physical entrance but also capacitational and methodological measures, in order for people to make a more autonomous use of the ICT, instead of remaining dependent upon external institutions. Another important issue is whether access is restricted to a limited set of predefined services or if users are encouraged and allowed to explore the potential of the technology in a manner that allows for them to select themselves those elements of the technology that best serve their interests (ibid.).

Local Contents

Another issue that has caught the attention of socially minded activists is the production and use of *local contents* in ICT projects. As has been discussed previously, ICT users in marginalized regions are usually confronted with both externally owned and planned projects and externally produced and designed technologies. In most cases, contents too come from external sources rather than community ones. Accessed web pages are created in external milieus, downloaded music and games bear with them "Western culture" and an overwhelming part of the material accessed is written in a foreign language (read: English). The possibility of accessing information from other parts of the world is certainly one of the cornerstones of the new technologies – particularly the Internet is based on this principle – and is probably considered a negative aspect of these technologies by very few people. The issue at stake is rather whether users are enabled and encouraged to combine such use with their own creation of contents, thus being participants rather than just spectators and followers. While this ambition is important for the autonomy and self-realization of any user, it may be of particular relevance for members of marginalized regions who have historically been dependent upon and fed with resources with origin in politically and culturally dominant societies. One of the most important aspects of new technologies for marginalized people might be its potential to make their voices heard on a global level and to facilitate communication with other marginalized communities – "[ICT] will be of greatest value as a technology to provide information from and about the poor", as Heeks argues (1999b). It must further be acknowledged that ICTs might not always be the best instrument for the fulfillment of the need to create and support "indigenous" sources and networks of information. In the words of Heeks (ibid.), "[t]he poor need access to new locally-contextualised information more than access to existing information from an alien context. The information needs of the poor will be met more by informal, 'organic' information systems than by formal, ICT-based information systems". In trying to assess ICT efforts from a social point of view, assessors should therefore seek to investigate the extent to which contents are produced locally and the ways in which ICTs are actually assisting – or impeding - the community in meeting their own information needs.

Another related issue is whether ICT activities are fostering a critical approach to alien information among citizens, or not. While the creation of local contents is crucial, community members must also be able to treat externally produced contents with carefulness. Such critical capacities are increasingly important in the modern media climate, as a handful of media conglomerates are dominating sources of public information. The Internet, in this case, may become an effective means for challenging voices to confront dominant apprehensions of the world and ally with other alternative forces. Used uncritically, however, the Internet risk turning into yet another way of distributing mainstream worldviews across the globe. A theme for investigation is therefore to examine the attitude that ICT users are attaining towards information technologies like the Internet, and their contents.

Maintenance & Empowerment

As advocates of autonomy and self-reliance for people of marginalized regions, critical investigators must also be attentive to the way the ICT efforts are organized practically. In ICT-for-development projects, the transfer of technologies is often eagerly prioritized at the cost of building a local capacity to handle those technologies (Dahms & Benjamin 2001). If Participatory Design is employed, future users are naturally more likely to be able to understand and take advantage of the ICTs. But this is seldom the case, for one, and even if users do participate in the design process to one or another extent, they will not automatically be empowered to run things by themselves. Furthermore, as Benjamin & Dahms (ibid.) argue, "the skills and experience required to make [the machines] function satisfactorily is based on cultural assumptions that are not easy to translate to different societies".

In an ICT project in a marginalized region, the recipient community may be dependent on a host of external resources, both human and material ones. For instance, technical expertise may not be available locally and spare parts and equipment may have to be ordered from locations far away. Worse even, those local people responsible of managing the project may not have been equipped, financially or organizationally, to solve such problems at all. Decisions may be taken on levels far above them, and they may have no influence over the allocation of resources, leaving them unable to administer the project according to the wishes of the community. Even within the community, decision making may be organized in a hierarchical manner, causing the majority of community members to have little influence over how to exploit the technology.

A critical investigator should pay attention to the way ICT efforts are organized and managed. Is the project governed locally or essentially controlled by forces external to the community? Are decision-making structures democratic and participatory or are they rather hierarchical and controlled by a few? Is the project dependent on several external factors that encroach its level of self-subsistence? These and other issues need to be discussed in order to understand the social significance of an ICT effort for its recipients.

Increased Participation in Decision-making

Modern digital technologies enhance the ability of people to engage in communication at distance. Electronic mail, discussion groups, online conferencing and digital polls are all examples of technological practices that allow people to share their opinions with other persons or institutions at locations far away. In doing so, these practices certainly give support to the argument for increased public participation in political decision-making. Although there is reason to not get too excited about the prospect of a "virtual democracy", not least in the case of marginalized countries (Hernandez 2001), the degree to which different ICT initiatives encourage and facilitate extended political participation by the public is certainly an issue worth attention. This is particularly true when it comes to initiatives sponsored by local, regional or national governments, where there exists an actual opportunity to accompany ICT innovation with changes in the structure of decision-making processes that allow for more, and distantly located, people to be involved. A social assessment model should investigate these issues and examine to what extent the use of new technologies admit people extended or different participation in the making of political decisions that affect them.

Meaningful Usage and Societal Transformation

Possibly of most interest for the critical observer is whether ICTs are used for the transformation of societies or if they are rather upholding prevailing power structures. In order to be able to improve their situation, marginalized communities cannot rely on ICTs only. An organizational structure that can make meaningful use of the information, technology and communicational tools obtained is crucial. This may seem to be an obvious point. Unfortunately, though, many ICT-for-development projects are focusing entirely on the

ICTs – indeed promoting their "revolutionizing" capabilities – without paying much attention to the social and economical structures that fundamentally prevent or allow actual change. "[E]ven if the ICTs with their potentials may in some regards be a useful instrument for assisting democratic practices, they do not by themselves guarantee such democratization", Hernandez argues (2001, my transl). "Contrariwise, if the adequate socio-political and socio-cultural conditions are not created, the ICTs may serve as a factor that increases the threats and risks, particularly of inequality and exclusion, with the cementation of antidemocratic sociopolitical practices as a consequence" (ibid.).

ICTs may certainly bring benefits to people without altering power relations, in the form of entertainment or, more importantly, new possibilities for communication among persons and groups. While these types of gains should not be neglected, a critical analysis of ICT efforts should pay more attention into analyzing the political framework within which ICT endeavors are carried out and discuss whether the technologies form part of strategies towards actual social change or whether they are strengthening dominant values and practices. Heeks (1999b) notes that in development projects, attention commonly "switches to the technical factors underlying development and, since attention is finite, away from the political, the economic and the social factors underlying development. Experience suggests that, where this happens, 'development' allows those with political, economic and social power to reinforce their position at the expense of those without such power". This notion is important and reminds of traditional critical theory and its comments on how the technological rationality makes people focus on rendering as efficient as possible the technical and economical means while being totally unequipped to appreciate the ends (see Horkheimer & Adorno 1973, Marcuse 1999). In a critical assessment approach, investigators must seek to politicize both the means and the obscure ends of ICT-for-development projects.

As an example, consider the concept of *competition*. It is fundamental to the capitalist organization of production and explicitly revealed in the commonly expressed need to "increase the competitiveness" of companies, organizations and individuals. This same terminology is ubiquitous in the dominant discourse on development in economically weak regions, not least in the area of ICT-for-development. The rationale behind such rhetoric is seldom discussed or confronted. Not often are people asked if what they really want is to engage in a competition out of their (by external institutions defined) poverty. It is agreed implicitly that development is essentially about competition. When new technologies are now incorporated into the agendas of major development agencies, they are launched primarily as tools for low-income communities to increase their competitiveness, and for their individual inhabitants to augment their value on the labor market in order to get an employment, a promotion or a raise. As Uimonen (2001:98) argues, "[w]hen it comes to developing countries, it is precisely the economic importance of information technologies for global competitiveness that makes the informational development such a compelling policy framework". The value and desirability of competition and the hunt for competitiveness is rarely questioned.

From a critical point of view it is worth asking whose interests this discourse is maintaining, in what direction it is shaping societies and also what role technologies have in these processes. In marginalized regions of formerly colonized countries, collaborative, communitarian and spiritual values have sometimes been the guiding ones up until recently, and in some communities they remain so in spite of the various types of military, economical and cultural crusades of the powerful countries. ICT-for-development projects, however, seldom give people of marginalized regions the opportunity to build upon such, traditional values instead of joining the capitalist competition arranged by their former colonizers. The kind of usage that designers, managers, or the simple arrangement, of such efforts promote is likely to be in interference with non-capitalist ideals (Avgerou 2000). Increasing individual participants' value on the labor market is in fact the raison d'etre of many ICT-for-development projects (Benjamin 2001). Consequently, the potential ICTs may hold for the

strengthening of alternative or traditional forms of societal organization is seldom explored. A similar situation may be experienced by women when men, as the dominant power in most societies, take precedence over how to interpret and use technologies. Women's issues and worldviews have to stand back for those associated with men and male values.

It follows that a critical approach to social assessment of ICT efforts must be attentive to the political clashes that unfold beneath the surface of ICT-for-development projects. A critically minded investigator might recognize the difference between, for instance, a computer project that serves to help people find an employment on one hand, and a project that strives to change the very nature of work in a democratic direction (cf. Ehn 1988), or to maintain traditional means of occupation through the means of computer equipment (cf. Ramos et al 2002) on the other hand. In the first case, it may be argued, the ICTs work within the prevailing political system, smoothening its functioning and perpetuating its dominant values, but without confronting it, whereas in the other cases, ICTs are used in order to challenge fundamental aspects of that very system, or alternatively, to confront its expansion. While the individual fortune of a poor, rural villager who manages to go from unemployment to an underpaid engagement should not be neglected, such a process – however meaningful for the well-being of the particular individual – differs from a more qualitative social change process that would explore alternative social and political solutions for marginalized people.

While the question of whether more profound social change is wished for, and whether the struggle for it is worthwhile or not, is one that needs to be reflected upon by the people affected, any attempt to assess ICT strategies without facilitating such reflection is indeed avoiding issues that are of fundamental social and political value to the stakeholders involved. The task for a critical approach is not to give simple answers but rather to open up discursive spaces where these matters may be discussed freely, by and with those concerned. There is no step-by-step schedule for carrying through this work but to begin with, instead of presupposing that there exists a general interest, shared between all stakeholders in ICT-for-development efforts – a common good joining together everyone from governments, business and development agencies, to beneficiaries and activists - social assessments should assume the opposite and strive to reveal conflicting interests related to these projects. They should be attentive of such issues as whether a project is beneficial for a community as a whole, for a certain group (and in that case which one), or whether they are rather assisting only fortunate individuals. Is the project communitarian in its nature, or rather individualistic? Is its values based on competition or are there more cooperative ambitions involved?

A critically minded assessor must seek to examine the overall economic and political strategies within which certain ICT initiatives are carried out and investigate the official as well as the (often unconsciously) hidden objectives of such initiatives. The advice Avgerou (2000) gives to information systems professionals involved in designing systems in the development context is equally valid for any assessment effort: "Rather than assuming that economic action, and in particular the western type of rationalized economic action and its institutions, are of general value and therefore of global legitimacy, there is a need for raising such questions as what values are rated the highest in a society, and who benefits from the maintenance of particular biases to certain values over others or from the overthrowing of status quo".

These words mark the end of the theoretical part of this study. The subsequent task is to appreciate the applicability in an actual situation of the investigational themes and concepts elaborated in this theoretical discussion. In part two of this text, I will present my reflections from the field study of the Lincos project in the Dominican Republic.

2. THE CASE OF LINCOS

BACKGROUND

The Dominican Republic

The Dominican Republic is a country of nine million inhabitants, located in the Caribbean Sea between Cuba, Jamaica and Puerto Rico, on the island of Hispaniola, which it shares with the republic of Haiti. The Dominican Republic, which following Columbus' arrival in 1492 served as the high settle of the Spanish colonization of America, gained its independence in 1865. Since then – much like any other Latin American nation – the country has been plagued by an array of infamous dictators, high levels of political corruption, dubious invasions by the United States and, as a result, widespread human calamity. Out of the population, of which the vast majority are descendants of Africans that were enslaved by the Spaniards, around thirty to forty per cent live in "poverty" (according to the World Bank [2002]), about half of the workforce is formally unemployed (ibid.) and for those who manage to obtain a job, salaries are minimal. Four out of five large businesses are owned by foreigners, predominantly North Americans and Spaniards (Howard 1998), many of whom exploit the economical conditions of the "Zonas Francas" – the free trade zones where foreign companies escape taxes and pay minimum salaries for monotonous twelve-hour working days. Others own large plantations, where Haitian immigrant workers are employed in what has been labeled "modern slavery" (Latortue 1999). Although the country is a primary exporter of agricultural products such as sugar, coffee, tobacco and fruits, only a minority of the population is reaping the incomes. Dominican politics traditionally caters primarily for the small but very wealthy economical and political elite and social welfare is practically non-existent. Past and current conditions have caused over one million Dominicans to flee the country – the largest diaspora in the world in relation to the size of the mother country (Howard 1998).

In the year 2000, Hipolito Mejía of the Dominican Revolutionary Party, took over the presidency from Leonel Fernández of the Dominican Liberation Party, after winning the election on a program that promised to take arms against corruption and improve the situation of the poor. Mejía soon proved incapable of eradicating corruption, however, and despite initial promises of the opposite, his economical strategy for the nation has to date been drawing to a large extent on a neoliberal agenda. Nevertheless, Mejía's government has initiated a loud-voicedly marketed "Plan against poverty" and many Dominicans experience that Mejía is launching a serious attempt to improve the situation of the country's marginalized communities, although discontent is beginning to spread. The plan includes efforts on infrastructure, education and attempts to extend the use of ICTs in the nation. The country's information technology projects are typically sponsored by the telecommunication industry and include a computer lab initiative for schools, and technological community centers such as Proyecto Ave [18] and Lincos.

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[18] www.proyectoave.net

The Lincos Project

The Lincos project is an initiative launched by Costa Rican foundation Entebbe[19]. The organization was founded by its current director, Jose María Figueres, former president of Costa Rica and an educated military engineer. Although Entebbe engages in other development projects, particularly related to environmental issues (reflecting Figueres personal engagement), Lincos – which stands for "Little Intelligent Communities" – is the organization's flagship. The Lincos project is carried out together with a host of cooperating actors, mainly representing business and academic institutions. The Massachusetts Institute of Technology and Instituto Tecnológico de Costa Rica on the academical side and Microsoft and Hewlett Packard on the business side, are among the most prominent partners. Altogether, though, some two hundred different institutional actors have been engaged in the project.

The Lincos initiative started its implementations in Costa Rica in 2000, with the intention of going international on a large scale eventually. So far, though, the Dominican Republic is the only other country to which the concept has been exported. Also in the year 2000, the government of the Dominican Republic, under president Fernández, closed a deal with Entebbe on the installation of sixty Lincos stations throughout the country. The plan was to have these installed by the end of 2002, on a budget of 60 million US dollars[20] (Lincos website[21], newsletter March 2001). President Mejía has continued the project, although reducing the plan to thirty units, and changing the name from Lincos to "Technology Centers for Community Development"[22]. A government office in Santo Domingo (the Dominican capital) called "Pequeñas Comunidades Inteligentes"[23] with around thirty employees is in charge of the project in the country. Entebbe is responsible for delivering the containers and upgrading the centers, provide training to its workers and develop the project in general. Half of the thirty centers have now been installed and the government has chosen not to continue the collaboration with Entebbe for the remaining fifteen, which will instead be realized under the supervision of the Dominican Ministry of Education. The cost of installing each unit is 2.8 million Dominican pesos (appr. 130 000 US dollars). This price does not include the administrational costs of either the central office or the individual units. A monthly budget of 25 000 pesos (appr. 1 100 US dollars) is allocated for the maintenance of each center, intended to cover salaries, as well as running costs, such as electricity and purchases.

According to the information provided by the Dominican Secretary of State, the principal objective of the project is to "attain sustainable human development in the selected communities, through processes of learning supported by different provided technological tools, contribute to eliminate the so-called technological divide, and guarantee that these remote communities have the same opportunities as other, more developed societies"(Lincos web page & information brochures, my transl.). A further purpose of the implementation of the project is "to make these groups of people of very poor communities with serious limitations advance as individuals, emphasizing education, health and a harmonious relationship to nature" (ibid)[24].

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[19] The organization is known formally as La Fundación Costa Rica de Desarollo Sostenible ("The Costa Rican Foundation for Sustainable Development"). The shorter name, Entebbe, is borrowed from the name of its founder's residencial area in Costa Rica (Hoffman 2002).

[20] The accurateness of this figure is dubious, and the contents of this alleged budget is unclear. Another newsletter confusingly even mentions an(other?) inversion of $180 million (October 2001). The Director of the Dominican administration of the project claims to never have heard of either of these amounts. See further below for some official economical circumstances of the project.

[21] www.lincos.net. All referenced newsletters are published on the website and were verified in December 2002.

[22] "Centros Tecnologicos de Desarrollo Communitario"

[23] "Little Intelligent Communities"

[24] Entebbes declared mission for the Lincos project is expressed slightly differently, as follows: "To help communities in disadvantage from developing countries to intelligently access and use a series of services and applications such as: Telemedicine, Internet, Electronic Communication, Videoconference,

What is a Linco?

What exactly is a Linco? The answer to that question has actually shifted during the course of the project's implementation. Until recently, the Linco was equal to a very specific concept – an industrial container, redesigned and filled with computers and a range of other high-technological equipment. For reasons that will be discussed below, however, the container concept has finally been abandoned and since one year back, all new Lincos are being built as ordinary houses, with a set of rooms throughout which the technological equipment is distributed. This development means that there are two types of Lincos – the two Costa Rican ones, as well as the first five of the Dominican ones are metal containers, while the ten most newly built Lincos in the Dominican Republic are installed into ordinary houses. In the Dominican Republic, however, the old containers are gradually being substituted for houses, and soon the different sites will all be of similar appearance. When it comes to the Lincos in Costa Rica, only one of them is in service at the time this is written and this case study has not covered the Costa Rican experience – it should be admitted that it may very well be different from the Dominican one.

The Lincos units all have a similar initial set of technological equipment. Each center has a set of computers from Hewlett-Packard. In the containers, there are five to six of them, while the new buildings have ten to fourteen[25]. The computers are regular PC's, Pentium II or III, with microprocessors from Intel. They are each equipped with a 15-inch screen, a set of loudspeakers, a CD-Rom player and a diskette station, and connected to a printer, which is too from Hewlett-Packard. Also provided by Hewlett-Packard is the scanner, to which one of the computers is connected, and a CD-writer at another one. A Hewlett Packard server computer provides the workstations with access to the Internet, through a VSAT satellite that has been mounted on the roof of the Lincos building. The centers also have a fax/copy machine, one to four satellite phones, one or two television sets with VCR and DVD players, a VHS video camera and a digital still camera, a telemedicine kit, an instrument for water and soil analysis, and a radio transmitter. The majority of the initially installed software has been provided by Microsoft. This includes the operating system (MS Windows 98), and the office package (MS Office), plus several other programs (MS Encarta, MS Money, Age of Empires, et cetera). Out of the few exceptions, most come from LCSI, another project sponsor, which produces educational software and has contributed to the project with their programs "Micromundos" and "Mi Isla de Fantasia"[26].

LINCOS & SOCIAL EMBEDDEDNESS

In the previous discussion on social embeddedness of technologies, a set of themes were brought up, suggested to guide the assessment of ICT efforts. It was argued that a critical social assessment should examine what type of usage different technologies allow, which behaviors they prompt and what social values they reproduce or confront. It was also suggested that a critical assessment effort should seek to reveal, although not exaggerate, the political significance of this embeddedness. As a further task, the critical investigator should draw attention to the prospect of alternative designs. Let us now take a look at the applicability of these themes in the Lincos case, by discussing a few examples of the technological choices and designs involved in the project.

Electronic Trade, Educational Computer Science, etc., within the training setting of the target population. As a result, these communities will be able to take a remarkable quality step in their development process and become Little Intelligent Communities, 'LINCOS'. (Lincos web page).

[25] Lincos officials have annonced that the number of work-stations will be increased to twenty-one

[26] The English titles are "MicroWorlds" and "My Fantastic Island"; respectively.

A Box from the Sky

The units making up the first set of Lincos were accommodated into industrial metal containers. Five such containers exist in the Dominican Republic and I visited three of them during a phase when they were about to be exchanged for ordinary concrete buildings. In all of the three sites, workers and users expressed serious dissatisfaction with the containers. At one of the sites, the Lincos staff was on a strike since six months because of the unbearable heat that the containers, which lack air-conditioning and proper ventilation, produce in the tropical weather. At another site, all computer classes had been cancelled, awaiting the inauguration of the new building, partly due to the heat conditions and partly because of the limited space provided by the containers – only five to six uncomfortably seated students fit into the tiny room, making it impossible to share computers between two persons, and leaving minimal space left for a teacher. The designers of the containers initially included a giant, pole-mounted awning above the container to cover it from sun (and rain). The Lincos staff soon experienced problems with this pricey gadget, however (it had to be taken down because of threatening hurricanes or to clean it from dirt and could not be mounted again by the staff, or it was simply in the way of the new house and had to be dismounted for that reason) and at the time of my visits, none of the sites was protected from the sun by this or any other means.

Another problem of the containers is related to electricity. Power shortages are very common in the Dominican Republic – most villages experience daily, several hour long interruptions – and when they occur, the Lincos staff must resort to the container's small power plant, which runs on gas and is extremely costly. One of the Lincos sites was simply closed down during power shortages, because of the inability to cover the gas costs with the limited economical means provided by the project's administration[27]. On the web page, Entebbe declares that the units will be supplied with solar panels (Lincos newsletter, November 2001), which would both increase auto-sustainability and be in line with environmental awareness (particularly since the Dominican electricity system relies on imported petroleum). The newsletter even claimed that the adequate technology has already been developed by the Lincos team and that it would be installed within short time at the Dominican Lincos units. To date, however, none of the sites has been equipped. A Lincos staff member in one of the communities commented[28]: "The bosses, when they were here during the inauguration, they said they'd bring twenty solar panels, but no…[…] Politics, you know, they talk and talk, 'we'll bring you this and that, sure we will, we're going to bring a wind mill to put on the roof to collect electricity'. But no". According to Luis Veras, director of the Lincos project in the Dominican Republic there exist no plans to carry out this work, except possibly in those communities that are not covered by the national electricity grid (which would make the motive instrumental, more than transformational).

A further drawback of the container concept was expressed by Mr. Veras, when explaining why it was eventually abandoned: "The container create the concept of temporariness, the people do not regard it as rooted in the community". While a container may imply some advantages when transporting the project to the remote communities ("it may even be transported by helicopter", the Lincos web page proudly exclaims) one may certainly wonder what value it has for community members (particularly as Entebbe still charges $5000 only

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[27] As mentioned above, one of the other two visited sites was entirely closed down and since I only spent a short time at the third one, I did not get a chance to investigate if the same thing occurred there. It is plausible to assume, though, that all Lincos sites that have the container are forced to take this measure during power shortages.

[28] When not stated otherwise, all quotes in this section are from interviews and chats with community members of either of the five sites I visited. Due to a promise made by me to the interview persons, neither their names nor their communities are named. This was my initiative, rather than their request, as I wanted the interview persons, particularly staff and committee members to feel comfortable with sharing their honest thoughts about the project. Allthough far from everyone had anything critical to say, the promise made must obviously be kept.

for carrying the container to the communities). As one observer commented, "[i]n practice, the mobility characteristic of the containers is irrelevant, since their final destination is the stationary implementation in one site"(Hoffman 2002, my transl.). Apart from symbolizing temporariness, the container invigorate the (in this case well-founded) feeling that the project has been developed externally and brought to the community in a top-down manner as a wrapped-up "development package". As one Olistica member who visited a Lincos container concluded, this concept is certainly not helping to demystify the technology or to integrate it in the community[29].

A reasonable assumption is that the container concept was developed partly as a marketing strategy. This small metal box, crammed with state-of-the art technology, obviously signals modernity and inventiveness to potential sponsors, buyers and reporters. Articles about the Lincos case have been thoroughly enthusiastic (as a search on the web will show), and evidently, Lincos fundraising has been highly successful. The container idea has been at the center of the marketing of the project – an image of the container was even included in its logotype. In a sense, the container is crucial for the Lincos project, something that is demonstrated by the fact that there is hardly anything mentioned on the Lincos web page about the Dominican administration's decision to abandon the unsuccessful concept (where it is mentioned, the limited space is the only declared reason for the decision). Marketing Lincos to more countries, Entebbe still relies on the container and its charismatic appeal.

The Lincos container, as these observations demonstrate, is the obvious example of how a design solution imposes certain social behavior on its users. The limited space offered by these containers prevents people from accessing them, and in some cases causes the technology to be left entirely unused. Its material and its lack of air-conditioning and ventilation have similar effects. The same goes for the inadequate electricity solution, which also causes the project to be unnecessarily costly for its Dominican users, and if utilized demands economical resources that could have been used for other purposes. For the people of the communities, the design is disastrous. For other persons, the same design may be conceived as successful, particularly for the Lincos officials. "They have their reality, we have ours", one of the striking staff members commented appositely, referring to those responsible of the design of the container.

The design of the container and its consequent social implications for users may be interpreted in political terms. One understanding is that the interest of the Lincos officials, eager to accomplish a marketable product, has taken precedence over the interest of the community members. As the dominant force in the development of the project and its technologies, the visions of Entebbe and the Dominican government have been favored, at the cost of the interests of community members.

When it comes to alternatives, the Dominican Lincos administration's decision to switch from the container to ordinary houses demonstrates how different designs may radically alter the way users experience a technology. The difference is significant. The heat is no longer a problem and the space of the sites is obviously much greater. The power plant solution has been replaced by generators, which store electricity from the ordinary power grid onto a set of batteries to be used during shortages, thus evading reliance on expensive gas supply. The buildings, looking like ordinary houses, and being built in the very community, rather than constructed in a foreign country and then transported there, are likely to have at least a slight effect on the experience of affiliation among community members. It was noted during the observations that the Lincos houses seemed to be far more frequented than their container equivalents. It is interesting to note from a political perspective, that when the government takes over a part of the design process from a business-oriented foreign institution, the designs end up being more favorable to the users. One speculation is that the government shares some interests with its citizens – after all it has launched a Plan against poverty and,

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[29] Personal Communication.

moreover, is dependent on their votes in the upcoming elections. Nevertheless, there are less favorable aspects of the new buildings too, as the following example of embeddedness in the Lincos case will show.

One Size Fits All?

The newly built buildings share one aspect with the deserted containers. They are a ready-developed concept, thought to apply to all the different communities involved in the Lincos project. Minor differences exist, specifically between the three different "batches" realized so far (units are built five at a time, with several months and a new contract with Entebbe between them), but basically, the architecture is one and the same in all of the communities. The committee and the workers do have a say in how to fit up the building once it has been built but they do not participate in designing it. While this remains true of most architectural projects around the world, it certainly perpetuates the image of the Lincos project as a "one-size-fits-all" model, developed externally to be subsequently brought to non-participating communities.
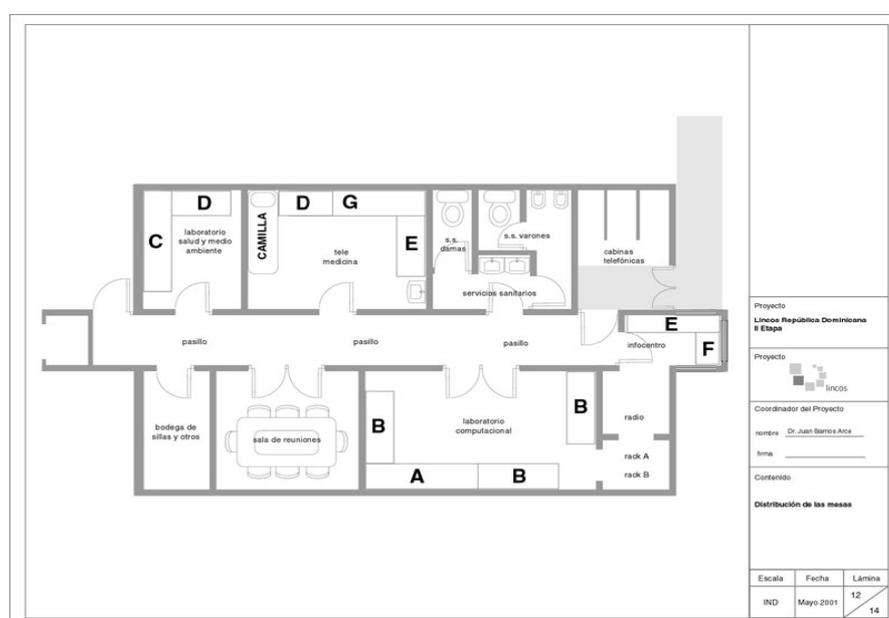

Figure 2. Architectural solution shared by all new Lincos sites.

Although Lincos' director asserts that "no two containers are the same"[30] – a statement for which I found little support – the uniformity is manifest in many aspects. Just like the architecture and the design of the container, the ICT equipment is similar at the different Lincos sites. One collection of information technologies is thought to be suitable for all the communities involved in the project. As remarked by one unimpressed observer: "Like a Swiss army knife with 23 functions, Lincos offers a fascinating technological potential, suggesting that with this the recipients are prepared to address any type of underdevelopment problem" (Hoffman 2002). What is more problematic than the fact that they are all the same – Dominican rural villages do indeed share many conditions and needs – is that the uniformity reflects the fact that the technology has not been adapted to the circumstances of the users, neither in its choice nor in its design. The Lincos website does curiously claim that the technological equipment is selected according to the needs of every community. However, the Lincos office in Santo Domingo distributes brochures[31] for every Lincos community, in which the technologies included are listed, and provided that not the exact

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[30] Interview with Lincos director Juan Barrios - "El tercer mundo en línea"
http://centralamerica.ms.dk/articles/Spanish/enlinea.htm (verified Dec 2002)
[31] Just like the technology itself, these brochures happen to look confusingly similar...

same set of technologies has been carefully chosen for all communities, the claims of the website do simply not seem to be accurate.

In providing the same predefined set of technologies to all Lincos, the project is perpetuating citizens' non-involvement in technological decisions, which not only reduces autonomy but may have further indirect implications for their conception of, and relationship to, technology. Interpreting this embeddedness of the technological design of the project in a political perspective, the management's quest for control over the Lincos project has in this way had serious social implications for the community members, who are left with a set of technologies that they have not chosen themselves, and that they in many cases do not know what to do with. In a sense, this approach is also strengthening the idea of technological determinism, suggesting that technology as such, rather than the choice, design and context of it, has the power to transform societies – an understanding that is vital (but hardly admitted) to the corporate image of the Lincos project.

Software Choices

Choosing Microsoft as a co-operational partner was probably thought of as a clever deal by the Lincos administration. Not only would Entebbe get the software at reduced (or no) costs, they would also get the software that is most extensively used throughout the world, including Windows and MS Office. The people that take courses at the Lincos are thus learning how to manage programs that are standards in most institutions in their society. This, in turn, can definitely be interpreted as a social benefit of the choice of software. On the other hand, as has been discussed above, this choice involves other implications which may be regarded as less beneficial, such as a dependency upon the goodwill of Microsoft, less opportunities to understand the nature of computers and the fostering of a credence to the ideas of intellectual property.

The specific attributes of the software (and hardware[32]) chosen is decisive for the way the Lincos users conceive the new information technologies and the world around them. Entebbe has chosen to cooperate with a company known for its hostility towards competing products. The economical and promotional gains of both Microsoft and Entebbe may be regarded to have been achieved at the expense of users' autonomy. Alternative solutions, such as free software, which would have provided them with a different understanding of ICTs and their potential possibilities, have been hidden to the community members. If computers were equipped with GNU/Linux instead of Windows, for example, users might have had a greater chance of becoming technology creators, rather than just consumers. On the other hand, they would not be able to apply for jobs that require knowledge of Windows. Introducing both proprietary *and* open software would possibly increase their chances to understand the difference and subsequently make active choices, suited to their own desires. Alternatives are many and there is no way of saying which strategy would be the most suitable one without a thorough knowledge about the users and their aspirations (something that neither I nor Lincos officials can claim to have achieved). The important lesson to learn is that the choice of software has decisive social implications for the users.

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[32] One interesting observation, although perhaps a little far-fetched in this context, is that Hewlett-Packard form part of the same powerful interest organization as Microsoft, the Trusted Computing Platform Alliance, whose aim is, among other things, to create closer ties between hardware and future operating systems from Microsoft, thus further limiting the autonomy of the user (Hammer 2002). The computers at the most newly built Lincos sites sport a sticker that says "Designed for Windows XP" (although they run on Windows 2000). Whether there already is an actual physical engagement to be found between the two or not, there clearly exists a strong connection and Hewlett-Packard has obviously declared whose side they are on in the software battle.

"No Comprendo"

To a different extent at different sites, the software, the manuals and even the keyboards of the Lincos are in English. At some of the sites, even the Windows version was English. There is most certainly reason to wonder why, since both the software and the manuals used, as well as keyboards, are produced on a large scale in Spanish. Whatever the reasons for this mistake, it has certainly caused implications for the users at the Lincos sites, where virtually nobody handles a second language. In one village, the scanner and the video camera had never been used until an American visitor was able to interpret the instructions for the potential users. It was also observed how users experienced serious difficulties in managing the software, due to them not understanding its language. In the case of the operating system, for instance, this problem is definitely severe. On a psychological level, the fact that software and other material are provided in English, may have further social implications. English already has a predominant position in the ICT world and increasing its dominance alienates non-English speakers further from the technology, increasing their already very real experience of ICTs as an external phenomenon with little foundation in their communities. On the other hand, if one wants to say something positive about this situation, people using computer programs in English are probably more likely to learn English (whether this is desirable or not is a another issue).

Politicizing this condition further is difficult, since there seems to be no good (or bad) reason behind it. At the least, it says something about the attitude of Entebbe and its attentiveness to the needs of the communities. Finding an alternative solution is more simple however – all software should be understandable to its users.

Conclusion

In this section, I have illustrated the relevance of the social embeddedness of technologies in the Lincos case. In different ways, the technologies involved in the Lincos project – and in any other technological experience – through the way they are chosen, designed and understood, all have different social implications for the members of their user communities and for other stakeholders. In the above account, I have only treated some of the technologies involved in the project, in order to demonstrate the applicability of the concepts suggested in the preceding theoretical discussion. One conclusion that can be drawn is that covering and discussing all the conceived meanings related to the physical attributes of the technologies would be impossible, and perhaps futile as well. An assessment of these issues therefore has to be minute, but selective. One task in the development of assessment models may thus be to elaborate ways of dealing with the social embeddedness in structured fashion. Further, as demonstrated in the case of the Lincos container, different technological characteristics are of different interest for different persons and are obviously also interpreted differently. A critical investigator has to examine the experiences of those persons or groups whose situation she is concerned by, while also contrasting those experiences with conflicting ones. In the cases above, I have sought to understand the social implications of the design from the viewpoint of the community members as a group, and to some extent compared it to that of the project's management (also as a group). In many situations it may be of equal interest for a critical assessment effort to investigate differing experiences between community members, drawing attention, for instance, to the way designs affect women in comparison to men.

When it comes to alternative designs, the possibilities are endless and there is no simple way of saying which design would be the best choice. From a critical point of view, advocating the autonomy and freedom of ordinary citizens, some choices would be more suitable than others and in the above reports I have tried to show some cases where this has been relatively obvious in the Lincos experience. To gain a thorough understanding, however, community members must be actively involved in the assessment process. A further task for future assessment models, is thus to elaborate ways in which the viewpoints of different groups may be appreciated in a relatively structured manner, so that alternative technological designs can be envisioned according to the experiences of marginalized groups.

The result of a social assessment will always depend on who it is carried out by. For other observers, including those claiming to share my outlook, the outcome of the Lincos observations would certainly be different. From a critical point of view, this fact should not be a matter of dissatisfaction, although the elaboration of social assessment models may indeed result in common ground to work from. The important conclusion in any case – and I do think that the Lincos observations make that clear – is that for any observer to gain a thorough understanding of the social aspects of ICT efforts, in marginalized regions and elsewhere, the design and its social embeddedness must be taken seriously.

LINCOS & THE DESIGN PROCESS

In the chapter on the design process, a series of themes and their significance for the social world of users and community members were discussed. Attention was drawn to such issues as whether or not the users are actively involved in the planning, creation and evaluation of technologies, and under which circumstances; to whom the process is open; how it is affected by socio-cultural structures; and whether participation is cosmetic, rather than empowering. Another investigational theme was the tendency of an ICT effort to build upon local knowledge and on the viewpoints of discriminated citizens. Recognition should further be given to the role of the designers, it was argued; whether they act primarily as technical experts, to what extent they share everyday life with community members, and to what extent their understanding of the problem is allowed to guide the process.

In the Lincos case, several of these issues are rather simple to deal with – participation is close to non-existent and the design process does not even take place within the borders of the country. With its uniform design and lack of participation, the Lincos project appears as the archetype of a "solution in search for an application". No part of the Lincos project has been developed on a local level. Instead, a host of institutions from different countries has been involved in developing everything from the container and its contents, to the "methodologies" supposed to be used inside them.

Lincos Coming to Town

Let us start with the actual decision of bringing a Linco to a community. Juan Barrios, Entebbe's Lincos director has asserted that the establishment of a Lincos unit in a community is "always realized upon the initiative of the people themselves"[33]. How he is able to make such guarantees is a mystery, since it must reasonably be up to the government of the Dominican Republic after having bought their Lincos units to make the decision on where to put them[34]. It is true that the government, once it has decided on a proper location, does turn to the local authorities of the community in question before having the Lincos installed. "They did introduce the project", as one community member said, "but speaking only to the important persons, without reaching the mass of the people". Further, as is common for these types of projects (cf. Benjamin & Dahms 2001) – on top of being the authorities, rather than "the people" taking the decision – the communities are not offered any alternatives to the project. They may indeed turn it down, but they are hardly likely to do so because the project would then go to another community instead. "It was like a lottery draw", one Lincos staff member remarked. A village committee member explained it as "a battle between two communities". While Mr. Barrios is most likely wrong when claiming that the Lincos are always brought on community initiative, it is true that the centers are

[33] Interview with Lincos director Juan Barrios - "El tercer mundo en línea"
http://centralamerica.ms.dk/articles/Spanish/enlinea.htm (verified Dec 2002)
[34] If there are any doubts, the dissemination of the units makes the case clear; out of 27 planned and realized units so far, 23 are located in the westernmost part of the country, in the border regions currently prioritized in the government's development efforts.

accepted before installed – by community politicians with no other options to choose from. In this case we may certainly talk about "cosmetic participation", if any at all.

Allegedly, an "ethnographic diagnosis" is the next step, and some sort of study is obviously carried out – the Lincos brochures mentioned earlier each present some community facts and a list of problems of the community. The quality of this study may most definitely be questioned, however, judging from the container scenario. In the words of one community member:

> – [...]It [the container] demonstrates that the project didn't analyze, it didn't get to know the community initially, it didn't make any diagnostic investigation [...]. This work wasn't done. This community that is very hot, a very high temperature [...], bringing a container, with no air condition, with very little ventilation [...], you can't work inside it. [...] This demonstrates the mistakes, that they should have studied the community better, in order to say 'well, we can't bring the container to [the village] because the temperature is very high'

In relation to the subsequent installation of the center, a town meeting is held, to which all interested community members are invited (allegedly, some 50-300 persons show up out of a typical population of 5-10000). At the meeting, a committee is elected to supervise the Linco. The idea of appointing a committee comes not from the community as such, but from "the high-up persons of the central organization of the project", as one committee member himself put it. This committee is the key to the community's influence over the center and consists of fifteen persons. By decision of the Lincos administration, nine of these are always community members on (the same) important positions in the community – the mayor, the elementary and high school principals, a representative from the catholic church et cetera. The remaining six committee members are elected by the meeting attendees, and tend to be significant village members as well. As was noted earlier, the community members have already at this stage been excluded from the creation of the Linco's technologies – which are developed by external institutions. When the committee is now supposed to guarantee their involvement in the project, membership is not only delegated by the government, but also, recalling the words of Heeks (1999b), "skewed towards the powerful and away from the marginalized". Moreover, they are non-users, or they are at least not chosen because of their status as users but because of their (high) social status.

As if this was not enough, the committee, whose members receive no payment, is not formed until after the installation of the center, limiting community influence over the design process even further. This is true of the first containers being brought as well as the most recently built Lincos, where the staff confirmed that the committee was appointed some three months after the construction of the building started. In the case of one of the container communities, the participation level was expressed fairly well by a favorably disposed staff member:

> – **In the process preceding the installation, didn't they involve the people of the community?"**
> – Yes, yes, sure they did! They came here and prepared the ground and people were curious about what they were up to and they informed people about the project.

Another member of the same community was less content with the way the installation was carried out. "It was very rapidly done; it wasn't a very well programmed process. A lot of people didn't notice it, because it was done so rapidly". In the case of the concrete houses, the construction phase is evidently a little longer, allowing more people to take notice of the center coming into life. The level of involvement seemed equally low, however, as in the experience of a young boy who attended classes in the center:

> – **Did you know anything about the Lincos before it was inaugurated?**

– Yes, because they built it right next to my school.
– **And did you know what they were building?**
– No, I asked the teachers and the teachers informed us that it was a 'center', but since
I didn't know what a center was...

The staff members are appointed by the committee, and thus also excluded from the design and installation phase of the centers. "We think that [being involved at an earlier stage] would be plausible", one staff member said. "That way we would have more knowledge about the project. Even so, when it comes to the basic knowledge, we have been well trained", he added.

Lincos Evaluation – Cries and Struggles

If users, staff, committee representatives and community members have had no influence over the design process, do they at least have a say in evaluating the technologies? Hardly - there exist no formally structured evaluations by the community members. Those assessments that are made are carried out by visiting Lincos officials. True, the containers are finally being replaced in the first batch of Dominican Lincos communities. But this is happening after almost three years, implying a very slow process, rather than an iterative one, open to the opinions and experiences of the users. As one staff member expressed it, "It was a cry from us, the local coordinators". In another community, no one is using the telephones because there is a Codetel[35] office nearby, where users can receive calls instead of just making them (and pay with coins instead of prepaid phone cards). A staff member commented: "We have struggled for a telephone with which we can receive phone calls, to send messages to the villagers so that they come here and return the calls. It hasn't been possible. We don't know the reasons. We don't know." This person was still very positive about the project, but in his choice of words, one might get a sense of the nature of the relationship between the community members and the Lincos officials.

Social Implications

It is not likely that the members of the Lincos design team have ever come to the Dominican Republic to "share everyday life" with the communities. The history of the Lincos container, for one, says they have not. Even Mr. Veras, the head of the Lincos office in Santo Domingo, recognizes the failure of the design process to take into account the local situation: "The container was designed with Costa Rica in mind. Costa Rica is much chillier than here". The container, with its effects, is not the only social consequence of a non-participatory, top-down and geographically external design process. The deficiency of the ethnographical study that is supposed to "select the most adequate technologies" for each community, is revealed already in the observation that all Lincos seem to have similar equipments. Making the failure even more severe, however, is the fact that the units have several applications that are never used. Neither the telemedicine equipment nor the water and soil analysis kit, both so cherished by the promoters of the project and strengthening the image of Lincos as a social panacea, have *ever* been used in *any* of the communities visited, with only a few exceptions for testing purposes. The videoconference system is seldom or never used either ("who would we videoconference with?"), and the same goes for an array of software (particularly those in English). Except for a few commonly used services (see below), fact is that most communities still wonder what they are supposed to do with their Lincos. The whole experience is best summarized with an excerpt from an interview with a community member:

– In the case of the Lincos projects...there was no real introduction. They didn't tell the people first, before bringing the project, instead they came with the project first and then they spoke to the people. The first thing should be to speak to the people, 'we're bringing a project, and we're bringing it to show you', speaking to different

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[35] A national phone company

sectors...that way they will know what the people think, 'well, we're going to modify this, we'll drop this thing that the people are not interested in'.
– **"That's what they call 'participatory design'..."**
– "Exactly, participatory design was never practiced [...]. The obvious consequence of this is that the people didn't give their support, they didn't attach importance to it, and with time the project diminishes, it won't be growing, because the people don't regard it as useful, because it doesn't have any importance for them, it doesn't have any value [...]. The consequence is fatal, very negative, and then the project is lost."

Conclusion

In this section I have illustrated the social relevance of the design process and the investigational themes elaborated in a previous section of the essay. The case, I believe, has been more than obvious. The organization of the Lincos project has not only excluded users from participating on any level of the design process, it has also disallowed them to take part in the planning and introduction of the project, failed to provide a structure for evaluation and totally neglected the local knowledge and situation. To the limited extent that community members have been involved, membership has been biased towards the already powerful and users have not been included. The design team – which has most likely never payed any visits to the communities, let alone shared their everyday life – has had the sole right in both defining the problems and working out the solutions, which have been of similar appearance and subsequently applied in an equal fashion in all the communities. The social consequences of these conditions are at the same time both obvious and serious. Out of a host of expensive technologies, only a handful are used to a reasonable extent, and the services they provide could be supplied equally well by any much less costly telecenter. Moreover, since the development of the technology has not formed part of strategies in line with community members own visions, and since decision making has taken place above their heads, people in general do not feel affiliated with the project and express indifference or, as in the case of some staff members, even frustration towards the project. Although the observations accounted for above speak for themselves, the attitude of Entebbe when it comes to these matters is best expressed on their own webpage: "With an adequate process of technological transference", it is predicted, "the individuals will accustom to the applications when they become adapted to the unit" – a statement that seems to have been guiding the Lincos design work and which reminds of the antithesis of the Participatory Design concept.

LINCOS & THE USAGE OF ICTs

The theoretical discussion of ICT usage in marginalized areas drew attention to an array of themes to be included in a critical assessment approach. It highlighted issues of equitable access, the creation of local contents, the conditions of maintenance, increased participation in decision making, and the meaning of transformational usage. As in the preceding sections, I will in the following seek to illustrate the relevance of these themes in the context of the Lincos case.

At the Lincos sites I visited, activities are concentrated mainly on three services: computer classes, websurfing and e-mailing, and photocopying. At occasional sites, the radio transmitter is also used extensively. Other services that the centers offer, including telephones, seem to be used to a very limited extent, or not at all.

Access for All?

The Lincos case – like most other ICT-for-Development efforts – has succeeded in bringing ICT access to people who had previously lived without it. Not only computer technologies, but also public phones are now available to people who were excluded from the use of such

equipment before. Observations at the Lincos sites have further confirmed that the access is somewhat equally distributed between men and women, as well as between different age groups. A couple of obstacles can be found that prevent some citizens from participating, however. In the case of Lincos, the charges of the services may be the primary reason for such restriction. Lincos prices are not high compared to those of other similar services, rather the opposite[36]. Nonetheless, even comparably low prices exclude the poorest parts of the population from participation. In the Lincos case, serving villages with official unemployment figures of over seventy percent, the attendance in classes I observed was considerably high, although the charges certainly excluded at least fifty percent of the population[37]. While charges are probably the most common factor of exclusion, there exists others as well. Some of them were accounted for above, as issues of social embeddedness, like software, manuals and peripheries in foreign languages, and unbearable heat. Others may include for example the formal "terms of usage" sheet or the general atmosphere of the site. In one of the centers, for example, a note with the terms of usage declared, among other things, that users were not allowed to "make politics" when using the computers. The fact that I never saw a member of the Dominican Republic's largest immigrant group, the Haitians, visit a Lincos site may be due to the issue of charges (Haitians make up the poorest part of the population) but could also be interpreted as a result of the typical Dominican attitude towards Haitians, which is prejudicial and de facto discriminatory. Another, more heterogeneous group that is excluded from access is the people that are unaware of the project's activities, or even existence. In the communities I visited there were always a considerably large amount of people that did not even know where the Linco was located.

One theme articulated in the theoretical discussion was whether there exist strategies in the community to unbalance access discrimination. In the Lincos communities I visited, such efforts were few. According to several Lincos staff members, there exists scholarships for children whose parents cannot afford their computers courses. After some investigation, however, I soon learned that these scholarships were donations from private persons or local businesses, thus neither communitarian efforts nor strategies initiated by Lincos as such.

Autonomy & Empowerment?

What about the creation of local contents? At the Lincos sites, locally produced contents are still very marginal and mostly limited to individual initiatives. Students use word processors to do their homework, others write résumés and every now and then people hire the digital camera to take wedding pictures. From what I gathered, there existed few or no collective efforts that sought to utilize the ICTs for communitarian purposes. Occasionally, specific individuals were engaged in attempts to create material directed at a communitarian level, however. In one village, for instance, an employee at the Linco used the video camera to make an educational film about the environment that he intended to show to young people for educational purposes. Another noteworthy process of local content creation is the radio transmitter – in those communities where it is actually functioning and used. Although most of the material transmitted is commercial music, the shows are still something created by and for the community itself, thus creating a sense of self esteem and autonomy.

The computer classes that are given are hardly creating an autonomous and critical attitude to ICTs and the information they provide, however. Computer software, most of it coming from one and the same manufacturer, as we know, is taught with the help of structured, written instructions, telling the students exactly what to do and the teachers seldom have much more computer skills than their students. These classes stand in sharp contrast to the marketed educational vision of the Lincos officials, where the technologies are used in exploratory and independent ways to accomplish ends in the community.

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[36] To use the Internet costs 10-20 pesos ($0.50-1) for an hour, and computer courses are 50 to 100 pesos ($2.50 – 5) per month.
[37] This is an appreciation, not a statistically secured figure.

Many persons express content with the fact that they now have access to new information. "Now we can look for facts about any issue", one person explained when asked to describe the benefits of the project. "For example, [...] when the problems with Bin Ladin began [...] I was interested in finding out who Bin Laden was [...] and I searched the Internet and I found out who he was". The concern about the validity of sources and, moreover, the political interest underlying any type of information was seldom expressed. In marginalized regions, where people may be unused to an uncontrolled flow of Western originated data, the importance of treating the information on the Internet with skepticism and carefulness may be particularly important and a suggested task for further elaboration of critical assessment models is to find ways of appreciating how informational "truths" are handled by users.

In the case of Lincos, where the government is in charge of the project, there is reason to examine whether the communicational tools provided are used within strategies to increase the political power of marginalized people. It seems that this has not been a concern in this project, however. Although Lincos is a part of the government's efforts against poverty, neither this nor other projects seem likely to threaten existing political relations. Roads are constructed, schools are built and ICTs are accessed, but the distribution of power in society remains essentially intact. Neither do people seem to be using the ICTs for political purposes of their own. Communicational activities are primarily carried out on an individual level; people use the e-mail for keeping in touch with friends and relatives, and chat rooms on the Internet are used for recreation.

Maintenance

Another theme to which attention was drawn in the preceding discussions of usage was the conditions of the maintenance and workings of an ICT-effort and whether it created self-reliance or dependency. My impression from the Lincos case is that the Lincos management tends to give responsibility to the individual centers while at the same time restraining their potential for self-reliance. In Lincos official material, it is stressed that it is up to the community to make the most of their Linco, yet they are hardly given any resources to do so. Each community is allocated 25 000 pesos (appr. $1.100) to cover their monthly expenses. The incomes from the services the Lincos provide are added to that number, but that amount is typically very small. After salaries have been paid, there is seldom much left. Lincos staff members testified that they sometimes had to wait up to two weeks before being able to purchase such things as paper and toner. Money is not the main problem, however. Most of the sites I visited experienced problems with their technologies. At one center, the Internet connection had been gone for a month, at another one the telephone had never worked and at several of them there were problems with the computers. When faced with broken machines, the Lincos staff is often helpless because of the malfunctioning communication between them and the central office. When I paid a visit to one of the centers, they had not had any contact with the Lincos officials for three months. One of the staff members told me that "[the computers] all have problems, all of them do. But we don't have any resources to fix them and we can't get a technician to come here and fix them.[...] The Ethernet cards are wearing out on some of them, that's why we can't get Internet on some of them, but we can't replace them.". They could not even reformat the computers because nobody knew where to find copies of the preinstalled software. And even if they did, he was afraid they would not know how to use them. At most of the Lincos sites the lack of economical resources and technical skills, and the dependency on external engineers severely reduced their self-reliance while the poor communication between the centers and the officials was often the cause of frustration.

Meaningful & Transformational Usage

When asked to explain the benefits of the computer labs, most people put forward the fact that young people are now able to learn how to use a computer, an opportunity that did not exist before. When further asked why this is beneficial, answers do not come that easy, however. This phenomenon can be interpreted as a sign of the penetrational capacity of the

Information Society paradigm and its accompanying access mantra. Just like people have come to equate learning with schooling (Illich 1997), and information with knowledge (Heeks 1999b), the Lincos case shows that it is now fairly evident that members of marginalized communities tend to associate computers with prosperity and advancement. When an answer was given, it was typically that the youth will learn computer skills and that way hopefully manage to obtain an employment. As has been discussed previously, these are problematic outlooks. The Lincos communities with their considerably high unemployment rates generally suffer from their inhabitants fleeing to the cities in search of income opportunities. The Lincos project, given that it succeeds in educating computer skills (which is doubtful), may actually expedite this process. As one Lincos worker put it, " If you are in computers here, what can you do? There is nothing here!".

The wish of many, therefore, is that the Lincos project and its subsequent provision of computer literate people, help to attract businesses to the respective communities. One hope expressed in one of the villages, was for a Zona Franca to be established in the region. People who had learned computer skills at the Lincos would then be able to find an employment in this industrial free zone, it was argued. Such a development would certainly be in line with the vision of the dominant approach to ICT-for-development. A critical observer would instead stress the terrible working conditions of the free zones and the maintenance of status quo in terms of societal power relations. ICTs in this case, would be used to marginally improve the economical situation of occasional individuals but not to provide assistance in communitarian strategies towards overall qualitative change. Dependence upon outside forces would increase and alternative ways to organize the community in a more self-reliant fashion would have to stand back while an iniquitous economical system, ruled by the dictates of economically wealthy powers, would expand without confrontation.

Lincos does exhibit ways of using its equipment in more self-sustainable ways, however. In one village, a young man who had spent several years working in a Zona Franca and was determined to never do so again, decided to make a garden out of his backyard in order to live off the consumption and selling of his crops. Knowing nothing about gardening, he borrowed an educational video from the local Lincos center and learned enough to get the plantation going. In this case, the Lincos actually assisted a member of the community, who had had enough of the prison-like conditions of the free zones, in realizing a vision to support himself in an alternative fashion.

The same experience may, on the other hand, serve as an example of another attribute of the Lincos case – namely that the Lincos benefits are dependent on individual initiatives and also contributing mainly to the personal progress of certain individuals. In other terms, Lincos, despite its officially stated ambition, has not managed to become a communitarian project, promoting and forming a natural part in strategies directed towards the advancement of the community as a whole. This fact was even acknowledged by a Lincos official who visited one of the sites during my observation. Lincos people typically blame this being so on the fact that the project is in its initial phase. As one person in the committee of a community that has had its Lincos for some two and a half years put it, "We are still young in this, you see". Another Lincos worker stressed that what is important at the moment is to teach community members basic computer skills before moving forward. This person does obviously have a point – although the quality of the education given at the sites provokes serious doubts on when and how the moving forward will actually take place.

One ongoing project, in which all of the Lincos communities are involved, might prove the capability of Lincos to use the technology equipment in a more communitarian fashion. In each community, a group community members (almost excludingly women) are about to finish an education giving them status as "Vigilantes de la Salud" – local health promoters. The objective of these groups, as the name implies, is to direct attention to health issues in their respective communities. For example, their work (which is voluntary) may consist in

informing citizens about how to take care of their garbage (typically thrown just anywhere by many Dominicans), how to interact with animals without taking health risks and how to protect themselves against various infections and diseases. In what way the Lincos equipment is actually thought to serve a function in this work seems to be a bit unclear, however. The telemedicine kit, for example, is not included in the education. ICT usage seems to be limited to making presentations and plans using parts of the Office Package. If, despite this, the Health Promoter project can be regarded as a promising attempt to incorporate the Lincos technology into a communitarian project, there might also be room for a more suspicious interpretation. The project could be understood as a strategy of the Lincos officials to respond to some critique and more or less desperately work out a way to exhibit the Lincos' value in community projects. The idea as such is indeed worked out by Lincos people in Costa Rica and not demanded by the villagers themselves. Following Lincos tradition, one single program, carried out similarly at the fifteen sites, is supposed to fit all the diverging communities involved. It remains to be seen what benefits this strategy can bring. "Until now, it has been very positive", one of the future health promoters attest.

Conclusions

In the final part of this section, and of this study, I have demonstrated how a critical assessment approach may investigate the usage of ICT in efforts in marginalized regions according to the themes presented previously in the study. As the Lincos case has vividly shown, the nature of the usage of ICTs in the development context is of major social relevance for the beneficiaries. The issues addressed here are of course just a small sample of all issues regarding the use of the Lincos units worth investigating. As in previous sections, the ambition has been to demonstrate how a critical perspective may inform the assessment effort.

SUMMARY

In this work I have, according to the initially stated objective, investigated and demonstrated how a critical social perspective may inform the assessment of ICTs in the development context. The main ambition has been to highlight the importance of a critical understanding of technology to form part of a critical social assessment framework and to subsequently provide some practical examples of why such an understanding is relevant. I have elaborated some ways to reflect upon ICTs in marginalized regions and thereafter shown how they can be used, by suggesting a set of investigational themes and illustrating their relevance in an actual ICT-for-development case. This work is thought of as an introductory framework for the assessment of ICT-efforts from a critical social viewpoint. It is my expectation that this framework can contribute to the elaboration of assessment models based on a critical social perspective.

Such assessment models would be an alternative to traditional models, such as the Readinessguide, for critically minded assessors. Rather than providing a well-ordered protocol for schematic judgment, my anticipation is that these types of models should serve as orientation maps, to be consulted for a more thorough, yet structured, appreciation of the social processes involved in any ICT experience in economically weak environments, and in the search for alternative paths. Of what value would such assessment models be? Can we really ask of projects such as Lincos to live up to the radical demands posed by a critical approach to technology and development? Perhaps not, but the point of creating such tools, in my opinion, is not as much to enable simple conclusions on the appropriateness of specific ICT efforts, as it is to guide people into a way of looking at such efforts that does not exclude fundamental social and political issues — thus allowing them to better judge whether the introduction of technologies into their communities is occurring in their interest. If and how citizens of marginalized communities should use ICTs are decisions that have to be made by these people themselves. Today, however, the dominant discourse informing such decision-making is so biased towards the idea of "progress" and the excellence of Western technology — even to the degree that marginalized people commonly understand their own culture as inferior and equate computers with prosperity — that one important task of critical activists and investigators is to direct attention to alternative understandings and strategies.

The main ambition of this work has been to direct attention to relevant theoretical discussions and to make an initial attempt to connect these discussions to the experiences of an actual ICT-for-development project. In order for this experience to develop in the direction of applicable assessment models, further exertions must involve the members of marginalized communities to a much greater extent than what has been the case in this study. Efforts underway by such actors as the Olistica network appear as a promising attempt to approach this task. My hope is that the thoughts, arguments and experiences of this study will be able to provide such endeavors with a critical perspective.

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[Note: This is a must-read for anyone interested in the politics and philosophy of Operating Systems (which, as this paper clearly demonstrates, every computer user ought to be). The work is uncopyrighted and unpublished. Contact the author at mervyn.hammer@ephorate.net for a copy.].

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