Ubicomp from the Edge of the North Atlantic: Lessons from Fishing Villages in Iceland and Newfoundland

Hrönn Brynjarsdóttir
Cornell Information Science
Ithaca, NY 14850 USA
hb47@cs.cornell.edu

Phoebe Sengers
Cornell Information Science
Ithaca, NY 14850 USA
sengers@cs.cornell.edu

ABSTRACT
In this paper, we enumerate initial lessons for ubicomp from our fieldwork in villages in Iceland and Newfoundland. Typically, 'development' is understood as bringing technology, and along with it, progress, from the Western world into developing nations. In the small, traditional Western fishing villages we are studying, residents have experiences with technology that complicate the assumed link between technological development and progress. Their stories suggest both promise and peril for the development of ubiquitous technologies, which truly speak to the needs of rural, subsistence producers.

Author Keywords
Sustainable HCI, Newfoundland, Iceland, ethnography, fishing.

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
Our goal in this ongoing study is to better understand the relationship between technology development, social and cultural values, and everyday lifestyles. We draw on the experiences of rural residents of two islands in the North Atlantic, Iceland and Newfoundland, whose economy is traditionally based around a subsistence fishery. In these societies, the drive to become 'modern' by adopting industrialized technology has played an enormous cultural role in the last 40 years, reflecting a desire to increase both everyday quality of life and the political status of what once were largely impoverished, marginalized societies. At the same time, some of technology's unintended consequences have led to serious cultural and economic trouble for rural residents. What Iceland and Newfoundland offer to ubicomp is a case study in the kinds of values and hopes that technology design often embodies; awareness of the pitfalls and shortcomings that standard technological approaches may carry with them; and suggestions for alternative ways of framing the problem of ubicomp design.

UbiComp 2009, Sep 30 – Oct 3, 2009, Orlando, Florida, USA.

CONTEXT AND METHODS
We are in the midst of two on-going field studies. One, led by co-author Sengers, takes place in the community of Change Islands, Newfoundland. This archipelago of about 250 residents sits off the northeast coast of Newfoundland. The community is traditionally a fishing community, but the livelihood of the community has been substantially damaged because of overfishing (mostly from offshore international factory trawling, not the small-scale inshore fishery favored by local residents) and as a consequence the community is rapidly declining in number. The community is considered fairly 'old-fashioned,' with many residents maintaining traditional skills and activities including hunting and gathering and small-scale agriculture. Nevertheless, residents are quick to point out the many changes that have come to their community in the last 40-50 years. From the early 60's until today, the island has seen the advent of cars and roads, running water, electricity, telephones, winter-time access to the mainland, and, most recently, broad-band internet. As a consequence, even relatively young residents have reflected on and can eloquently describe changes in lifestyle and attitude that have come with everyday technological developments. In Change Islands, Sengers has done 6 months of fieldwork including participant-observation, a small number of formal interviews, and the collection of oral histories.

The second case study, recently started by co-author Brynjarsdóttir, takes place in Grindavík, a small fishing town on the south coast of the Reykjanes peninsula. In January 2009, the population had reached a record high of 2850, in spite of roughly 800 people moving away in the previous year. This part of the country has been hit really hard during the ongoing economic crisis and in January 2009, unemployment in Grindavík had reached 11.6%, the highest unemployment rate for a single township in Iceland [2,8]. Fishery remains the main occupation for townsfolk, but there has been an increase in tourism related occupation. One example of this recent development is the opening of a museum on the history of bacalao fishing, Saltfiskssetrið, in 2002.

BEING 'OLD-FASHIONED', BEING 'DEVELOPED'

The first step we need to make, before we can discuss consequences for ubicomp, is to understand the fraught political and cultural climate that we are working in these communities in our role as technology designers. As technology designers, we tend to see ourselves as at the cutting-edge, bringing the future to today. Similarly, the rhetoric of the 'development' that technology should bring often rests on an ideology of one-way progression, in which Western, industrialized nations are in the future and less industrialized, rural or agricultural nations are stuck in the past and required to play catch-up. It is difficult to overstate the extent to which awareness of this power dynamic has influenced the cultural and political landscapes of Iceland and Newfoundland.

For example, one of the interesting characteristics you encounter in Icelanders is an immense pride in everything Icelandic. Literacy heritage, standard of living and being modern, are all likely to be mentioned when you ask an Icelander "what's so great about Iceland?" This short quote from a book titled: "The Problem with being an Icelander", written by an Icelandic economist in 1973, illustrates this beautifully:

"The history of Iceland is unique in the history of the western nations. …it is the history of one of the smallest nations inhabiting an independent modern state in our world." [1]

Understanding the tension between the desire to construct a favorable, modern, image to the outside world and the wish to maintain a connection to the ancestral heritage is crucial in working with marginal communities such as Grindavík.

Similarly, Newfoundland faces a similar tension between maintaining its unique ancestral heritage and becoming a modern, powerful society [6]. Its traditional semi-feudal society was based on scattered, tiny, and impoverished fishing settlements ruled over by an oligarchy of merchants in the capital, St. John's. When Newfoundland & Labrador joined Canada in 1949, it began a period of political emphasis on industrialization and modernization. In the 1950's and 60's the government embarked on a systematic program of 'resettlement' whose goal was to encourage, and sometimes to coerce, residents to leave their traditional way of life in remote settlements to move to cities and become industrial workers, making it more feasible for the government to provide social services. Unfortunately, resettled persons often found it difficult to find employment in the city, but were barred from returning to their villages where it would have been possible to maintain a subsistence lifestyle. Resettlement hangs over Newfoundland to this day as a cultural scar.

The political landscape of Newfoundland has been to a great extent constituted by the power dichotomies between Canada and Newfoundland, urban and rural, educated class and working class, modern and heritage, where in each case the former is considered 'good' or powerful and the latter is 'bad' or 'backward.' 'Newfie' jokes are an unfortunate staple of Canadian humour; Newfoundlanders told Sengers of trying to lose their accent when they move to the big city so that they will not be teased. Similarly, being described as being from the country, ´sveitó´ and ´gamaldags´ is not favorable in Iceland. Although heritage culture is increasingly appreciated within Newfoundland since resettlement, and being commoditized through the recent emphasis on tourism as economic alternative to fishing for the countryside, it is still the case that policy decisions – including decisions about where and how to adopt technology – seem to rest on the idea that rural Newfoundlanders should behave like city people (for example, work 9 to 5 jobs instead of following subsistence rhythms which require absence from paid work when berries become ripe or seals arrive).

As technology designers from the Big University we arrive in the middle of this landscape in both Iceland and Newfoundland. Technology is by no means neutral in this context, it is seen by residents and outsiders alike as a transmitter for modernity, and aligned with 'positive' and powerful terms: government, university, the city, and in our case the exotic and powerful USA. We find ourselves repeatedly needing to work consciously against these assumptions: to reach out to rural residents to make them aware that they are, in fact, the experts from whom we need to learn and to figure out what aspects of technology might fit the local community rather than simply imposing technologies designed with urban values and lifestyles in mind.

Lesson: Informed Consent

One issue that quickly arose for us on the ground was the serious mismatch between what is required for informed consent as understood by the university and the nature of true informed consent on the ground in traditional communities. For one thing, the university places great emphasis on the informants signing of formal, written consent documents. Yet for many traditional rural residents both in Iceland and Newfoundland, abstract bureaucratic documents are a typical and somewhat intimidating hallmark of urban and bureaucratic ways that carry with them a history of power imbalance and mistreatment. Given the history of one-way interaction between central government and remote villages, residents generally have no expectation they will understand such documents and understandably often have little interest in attempting to do so. For these residents, 'trust' resides naturally not in legalistic documents but in personal relationships with all their nuances; for example, one participant wanted to be interviewed, saying that he trusted Sengers to do what was right with what he told her, but adding emphatically that he would not sign any form that would formally make his experiences as such, open for research. A participant-observation model which requires researchers to maintain personal responsibility and judgment over what and how material may be made public and seems a better fit for

residents' understandings than a more formal, consent-form-based model.

It is difficult to see how remote, rural residents are likely to be able to generally have informed consent in academic research when many have no everyday experiences to ground what 'research' is or how their experiences and insights might inform that research. In the case of Change Islands, we found it useful to adapt our research methods and core topics to ones that were more familiar to island residents. We noticed that island residents talked frequently about the changes in lifestyle they had observed on the island in their lifetime, a topic that resonated with our interests in the relationship between technology and social life and values. Rather than developing cutting-edge, creative research methods which even academics might have difficulty understanding – as was the original intention – we used standard oral history procedures to gather people's stories about these changes. This provided an accessible frame in which people could easily understand what was of interest to us and why, and which allowed them to make truly informed decisions about whether to participate.

Similarly, providing an Icelandic translation of text and actual content in the consent forms proved to be an exercise in diplomacy and trial by fire. Offering informants to call a toll-free number in the USA with complaints about their participation simply does not make sense when the informants are say, a group of 60-some year-old Icelandic fishermen with limited knowledge of the English language, let alone the language of bureaucracy in English. Making good-hearted jokes about the "crazy bureaucracy in the USA" and how Brynjarsdóttir is at the mercy of this paperwork for her schoolwork has helped Brynjarsdóttir´s informants come to terms with this unnatural and clumsy part of their experience with Brynjarsdóttir.

This leads us to question the validity of the University's construction of our participant's informed consent. Is it really informed, and in what sense?

Lesson: Preserving local cultures

The power dynamic between urban and rural in technology research is not only relevant to the methods that we as researchers employ but also the design strategies that appear to be available to us. For example, work in HCI on heritage culture preservation is clearly relevant to the experiences of these rural communities. Yet, on the ground in Change Islands, Sengers found that the orientation towards how to preserve heritage culture tended to differ dramatically between residents who were locally born and those who moved to the island from an urban environment. Urban residents tended to focus on preserving artifacts and knowledge, such as renovating the local fishing stages (work areas) or collecting sets of landmarks traditionally used to guide fishing. They sometimes expressed frustration at local residents who seemed to think little of tearing down historic structures or doing away with traditional practices such as animal culture which had become difficult to maintain owing to a changing regulatory and economic environment. Local residents, in contrast, sometimes spoke with heart-breaking nostalgia of lost *social* interactions – of fathers teaching sons how to fish, of the lively village dances that used to occur every weekend but with the decline in population now happened only once or twice a summer. They seemed to feel that once the reason for the cultural form had gone – the son had moved to the big city to find employment, the fisherman had been forced to retire because the cod was disappearing – there was no point in preserving its empty hull, of writing down the fishing knowledge that won't be passed on to a new generation or maintaining the fishing premises where no one will work. In a way, the emphasis for urban residents was on maintaining a 'dead' or fixed culture, while the emphasis for locally-born residents was on living forms of culture.

Although initially the problem of how to apply ubicomp to heritage culture seemed straightforward – for example, collect people's stories and create a ubiquitous tour where visitors can hear the stories in the places where they happened – Sengers realized after talking to local residents that such solutions to heritage culture tend to speak only to urban residents' interests in preserving the hallmarks of culture, and did little to speak to local residents' desire for the culture itself to stay alive. Unfortunately, the latter seems to be a much more difficult problem than the former. Yet it also provides an opportunity to think about how ubiquitous technologies might be able to support, extend, or re-enliven some of the traditional social interactions rather than only maintain the trace of institutions that have already disappeared.

Lesson: Physical vs. Abstract Skills

While the previous lesson suggests special interest needs to be paid to counterbalancing the likely urban, educated focus of ubicomp, in other ways ubicomp may provide particular benefits in a rural context. One of the characteristics that greatly differentiated the life of Change Islands residents from our own is the extent to which they engage in physical activity throughout the day. Men in particular traditionally spend most of the day outside engaged in chores such as fishing, repairing their boats and homes, and tending their gardens. One neighbour asked Sengers why he never saw her husband (a computer scientist) outside. She tried to explain that he was working on the computer, but the neighbour seemed to have little frame of reference to understand how working on a computer could be work, and how a person could spend the entire day doing so. It was a bit shocking for Sengers to realize how much of her life from social contacts to work to shopping was normally transacted in the virtual world rather than in the physical world of the everyday.

For residents such as Sengers' neighbour who have spent their lives in working-class careers and engaged in physical, subsistence activities, the abstract world of the computer is

indeed a strange place. Zuboff speaks of the difficult transition from physical labor to abstract labor in her case study of computerization of workplaces, documenting the abstract skills that a person must acquire to be able to function in a computerized workplace and the very different experience and orientation a person must have to be able to work in the symbolic realm [9]. Ubicomp suggests a different possibility – the ability to stay in the world of physical skills even while engaged with the abstract world of computing [5].

CONCLUSION: TECHNOLOGY IS NOT ALWAYS A WIN

The installation of a two horsepower motor in a rowing boat in Ísafjörður, western Iceland, in 1902 is generally considered to have transformed fishing in Iceland. The profession had up until then revolved around subsistence for the individual fisherman and his family. Now fishery became industrialized and a period of rapid growth and expansion followed [3]. According to Karlsson, this industrialization allowed Iceland to join their European contemporaries in the industrial revolution, albeit half a century late. Thus Icelanders were in a particular rush to catch up with their contemporaries on the continent [4]. This desire, or drive, is still present. The following is a quote from SE, a senior fisherman in Grindavík: [translation by Brynjarsdóttir]

"*…there's just a great amount of technological development going on here…and it's not necessarily from abroad [he says with pride]. We invent ourselves…and we are really quick to adopt the technology. If there's anything new…well, then you'll see it on just about every vessel.*"

For bigger vessels, this technological development has manifested itself in the installation of processing and freezing equipment on board, as opposed to bringing the catch to shore, unprocessed. This has afforded the fishing industry in Iceland to further entrench itself as a serious contender in the international fish trade. However, the focus on trawler processing is at the cost of land-based processing. The situation in this industry is particularly tricky in Iceland; since it includes a high level and very political discussion about government fishery management in addition to understanding what is going on, on the ground. A job at the local fish processing plant is one of very few options for women in many of the smaller coastal towns in Iceland [7]. With the emphasis on utilizing the technology for onboard processing and freezing, a secure occupation in the local fish plant is now a thing of the past for these women whereas catching, processing and transporting the fish is still a viable occupation for the local men. This issue remains relevant as unemployment in Iceland is expected to increase even further in the current economic depression.

This example highlights how technological advancement; in spite of being welcomed in general can be a very mixed bag. Our research in this area so far suggests that technology development carries a great deal of cultural baggage, and its consequences – both intended and unintended – are much more complex than the simple ideology of unconstrained progress would suggest. We suggest several key questions that ubicomp developers should be asking when working with remote, rural communities: (1) how is an urban, educated point of view built into my methods and design approaches? (2) to what extent are these aspects truly appropriate and beneficial for the communities that I am working with? (3) what truly unique aspects of these communities might it be worth addressing with technology, even if they are not valued by most governments, industries, or academics? (4) what might be the unintended consequences of these technologies? Answers to these questions will be difficult to uncover, but reflection on these issues may help to mitigate some of the difficult political challenges for remote, rural communities.

ACKNOWLEDGEMENTS

This research was funded by NSF grant 0847293, by the Stages and Stores Heritage Foundation, and by a grant from The Center of Excellence in Gender, Equality and Diversity Research in Iceland. Many thanks to the people of Change Islands for their openness and generosity.

REFERENCES

1. Gíslason. G. Þ. *The problem of being an Icelander: past, present, and future*. Almenna bókafélagið, Reykjavík, 1973.
2. Hagstofa Íslands. Mannfjöldi: Búferlaflutningar milli landsvæða eftir kyni og aldri 1986-2009. http://www.hagstofa.is/mannfjoldi
3. Information centre of the Icelandic Ministry of Fisheries and Agriculture. The age of motor. http://www.fisheries.is
4. Karlsson, G. *The history of Iceland*. University of Minnesota Press, 2000.
5. Klemmer, S.R., Hartmann, B., and Takayama, L. How Bodies Matter: Five Themes for Interaction Design. *Proc. DIS 2006*, 140-149.
6. Major, K. *As Near to Heaven By Sea: A History of Newfoundland & Labrador*. Penguin Canada, Toronto, 2002.
7. Skaptadóttir, U. Gender Construction and diversity in Icelandic fishing communities. *Anthropologica* (38), 271-287, 1996
8. Vinnumálastofnun Íslands (Directorate of Labour, Iceland). Staða á vinnumarkaði Janúar 2009. http://www.vinnumalastofnun.is
9. Zuboff, S. *In the Age of the Smart Machine*. Basic Books, New York, 1984.