Leavers and Takers: Alternative Perspectives on Universal Access to Telecommunications Technologies

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Foreword

Whether you agree that access to technology in developing nations is detrimental to the maintenance of their cultural heritage, the reality in the world today is that a predominantly Western approach to the use of technology is subverting these cultures at an accelerating rate. A new form of cultural imperialism is emerging as tribal communities become wired to the Internet, gain access to satellite television, and begin using global positioning systems to enhance agricultural productivity. Many Westerners who favor the preservation of traditional, indigenous cultures tend to take a negative view of this phenomenon. Yet, if there is money to be made in the process, it is inevitable that some multinational corporation will find a way to bridge the divide that separates first and third tier cultures for the purpose of opening new markets for their high-tech wares. On the other hand, it seems a bit patronizing and paternalistic for those of us accustomed to the widespread use of technology in our everyday lives to conclude that traditional cultures are too inexperienced to cope with the negative influences that technology is certain to have on their cultural character. The authors of this paper are not advocating the annihilation of indigenous cultures but are attempting to adopt a realist perspective towards the problem of cultural assimilation. Given that the adoption of First World telecommunications technologies by tribal communities is an unavoidable fact in today's modern world, the authors seek ways to ameliorate the negative influences that these technologies may have on the unique aspects of indigenous cultures. Encouraging tribal cultures to participate in the development of Internet content and new interface designs can only reduce that impact. Our goal is to set aside the First World "Taker" approach and initiate a dialogue with Third World "Leaver" communities based on mutual trust, respect, and a sincere desire to imbue humankind's digital archive with multiple perspectives.

Abstract

As pervasive as the use of the Internet has become in the United States, a huge percentage of the world's population has yet to ever use a telephone. It seems ironic, then, that there is a concerted effort on the part of industrialized nations to first hook up their traditionally disadvantaged citizens to the Internet and second, to hook up citizens of developing nations. This paper addresses the universal access phenomenon by considering the growth of the Internet in terms of *Leaver* and *Taker* users—idioms usually associated with a culture's interactions with its environment. Leaver cultures interact with their environment in a sustainable manner while Taker cultures produce more than they need and impose their ways upon others. The Internet is explored as a community of users, which in its current state is dominated by Takers. However, realizing the need for a more heterogeneous Internet community, this paper explores incentives for Leaver cultures to assimilate online and methods of improving interface designs to be more intuitive to Leaver communities. It is hoped that a tragedy of the commons of Internet resources can be avoided as more Leavers participate in the sustainment of the Internet as a valuable tool for all communities.

Rapid Internet Consumption by Takers

Growth of the Internet

The explosion of the Internet is an unprecedented event in human history that has totally transformed the means by which we communicate and share ideas. As a broadcast, information dissemination, and collaborative medium, the Internet has redefined our perception of time and space and has opened the doors to the possibilities of a geographically dispersed, global intellect. The benefits of the Internet are apparent, especially in education and economic growth. Now that use of the Internet has passed the early adopter's phase, altruists have taken to making the assumed benefits of the Internet available to the less fortunate. Public and private initiatives around the world are working to provide all citizens of all nations with access to the global infosphere. In the United States., federal monies are set aside to develop community technology centers, train K-12 teachers in effective use of technology, and provide discounted rates to telecommunications technologies in schools, libraries, and rural health care providers. In the international arena, the move is now on to wire tribal communities and provide them with access to the "wonders of the Internet." These programs usually have an explicit goal—to bring the benefits of the Internet to the less fortunate so that they will not be left behind, according to First World definitions of progress.

In the guise of "progress," developing nations and tribal cultures are dying out as broadcast telecommunications saturate the airwaves with what is primarily a Western worldview. There is now an increasing urgency to capture the essence of these cultures and get their information online. The typical top-down approach in the United States of giving technology to new users and telling them how to use it is causing less dominant cultures to be consumed by U.S. perspectives on technology use. We are providing the technology and homogenized content but are not making a concerted effort to get the cultural views of others online so that the entire Internet community can benefit from access to a more diverse world perspective.

Leavers and Takers

Ever since the dawn of the agricultural revolution 10,000 years ago, humankind has embarked on a split cultural path. Daniel Quinn's book *Ishmael* explores this diversion of Leaver and Taker cultures to show how the dominating *Mother Culture* in Taker societies is devouring Leaver cultures at the expense of a sustainable environment (Quinn 1995). Taker cultures have practiced totalitarian farming in both the East and West for the past ten thousand years. Leavers can be hunters, gatherers, herders, and even farmers on a small scale. Contrary to Takers, Leavers do not produce more than they need, rapidly expand their population, impose their way on others, annihilate species that threaten crops, nor otherwise engage in totalitarian farming. Traditionally, Leavers see immediate resources as necessary for survival whereas Takers see resources as a commodity to be exploited. Similarly, the Internet, while once a more balanced community of Leavers and Takers, is becoming a more uniform clique of Taker users.

The Taker/Leaver Dilemma on the Internet

It is essential that we think critically about the role that the tools and interfaces that we create play in human evolution and everyday life. However, this paper is not a soapbox monologue to criticize or to spew recommendations for the effective uses of the Internet in developing nations. Neither do the authors intend to tell people what to think as this would represent Taker sentiments. Instead the approach is to open discussions and provide some cultural context as the Internet becomes more pervasive worldwide.

Internet History

Development of Infrastructure and Content

In the early 1960s, two men on opposite ends of the U.S. foretold the emergence of a new communications paradigm that would change the world. On April 23, 1963, J. C. R. Licklider at the Massachusetts Institute of Technology wrote a series of memos to the "Members and Affiliates of the Intergalactic Computer Network." In these memos he described the social interactions that could be enabled through what he termed a "galactic network" and posited the theory that computers might one day help researchers share information and eventually enable communities of people with similar interests to communicate with each other online. In October of that same year Douglas Engelbart, the inventor of the point and click device affectionately known as the mouse, published his groundbreaking paper "Augmenting Human Intellect: A Conceptual Framework," about a tool-using device that would transcend mere hardware and software to incorporate new ways of thinking, working, and communicating to extend our powers of communication. It was his assertion that new languages of representation and new methods of training would be needed to manage the use of this tool as part of the scientific, educational, and industrial enterprise in which it would likely flourish (Rheingold 1993).

At about the same time, the Department of Defense's (DOD) Advanced Research Projects Agency (ARPA) and the Rand Corporation, a DOD think-tank, were actively funding research into packet-switching networks and software protocols for distributed computing. Their effort was targeted towards developing a redundant, decentralized communications system for the military to be used in the event of a nuclear war. As a government sponsored project, the ARPAnet as it was known at the time, was originally built by Takers but was gradually adopted (some might say liberated) by the Leaver culture. The Leaver culture, in this context, refers to the computer programmers who developed the network enabling software (TCP/IP, Unix, etc.) and shared the fruits of their labors with others at no cost. What emerged was an online community of like-minded individuals that encouraged its members to contribute their efforts for the greater benefit of all. This system worked exceedingly well and was a major contributing factor toward spawning the continued growth of the Internet throughout the 1970s and into the mid-1980s. What we now have as a result is a worldwide communications network that is used as a medium to connect such diverse

groups as Mexican revolutionaries, large computer corporations, Chinese pro-democracy activists, and elementary school children.

The Vast Vanillasphere

Unfortunately, it appears that the Internet has now become a victim of its own success as the percentage of individuals contributing to the system diminishes relative to the overall user base. The once highly touted concept of free universal access to humankind's deep digital archive is quickly becoming a commercialized front-end to a more homogenized and abridged edition—the info-sphere as vanilla-sphere, so to speak. The Internet is encountering a phenomenon known as *monoculture*. (The word *monoculture* originates from within the disciplines of ecology and biology.) In ecology, monoculture refers to the dominance or exclusive prevalence of a single species or genetic type in an ecological system—a state typically regarded as pathological and dangerous. Agricultural monocultures, for example, are highly susceptible to blight, soil depletion, disease and other disasters. Similarly the Internet, with its predominantly Taker content, is susceptible to the ills inherent in a culture dominated by a single group.

It was perhaps inevitable that the "network of networks" would again take on some of the attributes of the Taker culture that spawned it as a greater and greater number of users get connected only to search for information relevant to their specific interests. Unbridled growth tends to destabilize any system and the Internet is no exception to this rule. Even the common term "Information Superhighway" that was coined to refer to the Internet-as-freeway concept is inherently biased towards a Taker culture in which there are specific rules for use similar to that of the U.S. interstate highway system. Like an interstate highway, users are encouraged to enter and exit only at established access points; travel at no less than the minimum speed limit (which automatically excludes that subset of the population without the resources to purchase a suitably sophisticated vehicle); and obtain a license from a governmental authority. Users who come to the Internet from cultures unlike our own soon discover that the analogy to a highway system is not only inappropriate as a metaphor but also illogical in its adherence to the strict rules of the road (Payton 1999). As anyone who has driven in areas outside the U.S. can attest, many nations do not follow our conventions in moving from place to place.

As Internet access and content continue to grow exponentially, the online environment is beginning to take on the trappings of the more traditional consumption-oriented, broadcast media. It might be wise at a time such as this to reflect on the words of J. C. R. Licklider who, in 1968 said:

> "We believe that communicators have to do something nontrivial with the information they send and receive. And .... to interact with the richness of living information—not merely in the passive way that we have become accustomed to using books and libraries, but as active participants in an ongoing process, bringing something to it through our interaction with it, and not simply receiving by our connection to it …. We want to emphasize something beyond its one-way transfer: the increasing significance of the jointly constructive, the mutually reinforcing aspect of communication—the part that transcends 'now we both know a fact that only one of us knew before.' When minds interact, new ideas emerge" (Licklider 1968, pg. 21-31)

In a deeply ironic way, the Internet reverses the extractive logic of classic colonialism in Leaver communities—instead of freighting raw materials (ore, precious stones, humans) out of developing nations for consumption by the Taker communities, the information order, to the extent that it penetrates the unwired world, is becoming largely devoted to freighting Taker information in all its variegated forms into Leaver societies.

An Inclusive and Representational Space

Grasping an Internet Community

> "**The Internet is revolutionary, but not Utopian**. The Net is an extraordinary communications tool that provides a range of new opportunities for people, communities, businesses, and government. Yet as cyberspace becomes more populated, it increasingly resembles society at large, in all its complexity. For every empowering or enlightening aspect of the wired life, there will also be dimensions that are malicious, perverse, or rather ordinary" (www.technorealism.com).
> -- *Technorealism Principle #2*

The Internet community is a subject of growing interest not only to its users, but to those wishing to make a profit from its far-reaching impact, and

traditional societal researchers (sociologists, anthropologists, etc.) as well. The word *community* stems from the Latin root word, *communis*, which means "common." The *common* aspect of the Internet is its geographical component, or lack thereof in "cyberspace." Yet within this virtual space, virtual communities evolve as persons with similar interests find each other. Rheingold defines virtual communities as "social aggregations that emerge from the [Internet] when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace" (Rheingold 1993, pg. 4). Virtual communities are more often than not unplanned, as opposed to "real" communities. Within all communities, virtual or real, the structural process is communication.

Community is an important aspect of life for most people. Cooley says that all normal humans have a natural affinity for community. He suggests that the primary factor inhibiting the formation of communities, no matter what their scale, is that they are difficult to organize (Fernback & Thompson 1995, pg.1). As any person who has attempted to catalog the vast resources available on the Internet and numerous special interest groups can attest, organizing the Internet as a single community is an impossible feat.

Special Interest Group Domination

The utopian vision of an Internet where all individuals have an equal voice will probably never be realized. The structure of the Internet community is such that all individuals do have the opportunity to express their views through newsgroup postings, webpage development, and the like, yet Internet users' ability to select the content that interests them most results in the development of special interest virtual communities. It is widely understood that virtual communities are communities of interest rather than of geographical proximity or of historical or ethnic origin. There is no world bulletin board system that all Internet users regularly access, although users can choose to access the thousands of special interest Usenet newsgroups. Assuming the reader of this paper is a frequent user of the Internet, how many times does he or she access websites with content posted in a foreign language, content focused specifically for a particular ethnic group, or content developed by hate groups? Although this information is widely available on the Internet, users will gravitate towards content that meets their particular interests, and not pay much attention to Internet content focused for other groups. Confirming this assumption, a study conducted by researchers from Xerox found that five percent of all websites

received 74.8 percent of all web traffic (Markoff 1999). This finding refutes the claims that the web is a great equalizer. As economists would say, the Internet appears to be a "winner takes all market."

Although online communities may be formed that reinforce social relationships among like-minded individuals, members of those groups often will have a diminishing need or opportunity to interact with others in the Internet society at large. Instead of creating increased cohesion, virtual communities are likely to have the opposite effect on the larger collective. Just as multiculturalism can and does have a positive influence on self and group identity but when taken to an extreme can disrupt the larger society, so virtual communities can foster anomie. A mass society may indeed lead to atomized individuals, but it may also lead to atomized communities as well. And, as with multiculturalism, different views can be assimilated into the larger society. But because virtual communities are likely to be private communities of interest, they will not readily or serendipitously be exposed to differing views that will help them and the larger society grow and adapt to a changing world.

Leaver Incentives

There are three primary reasons why Leaver cultures should be encouraged to join the online community: (1) multiple perspectives benefit all, (2) Taker cognizance of Leaver concerns, and (3) the need to prevent anomie.

Multiple Perspectives Benefit All

The special interest groups currently dominating the Internet community are generally composed of Taker users. Takers and Leavers employ different world models and as a general rule, multiple perspectives on the same subject tend to benefit all engaged community members. It is therefore advantageous for both Taker and Leaver cultures to have access to each other's cultural perspectives via the Internet. Unfortunately, the content currently available on the Internet is primarily derived from Taker cultures.

There exists a real need for Leaver content to be developed and presented by those cultures with first-hand knowledge of their own cultural perspectives. Outsiders who study these cultures and present their findings are inherently biased by their own perspectives. Efforts are underway at various levels for community members to document their own histories and make them available

via the Internet for worldwide consumption. In the Blacksburg Electronic Village in Blacksburg, West Virginia, and in the Oglethorpe County School System in Georgia, for example, students interviewed community members about their local history and presented their findings on the Internet. This is beneficial to the community at large as it preserves the knowledge of their history and culture first-hand. It also makes it available to be indexed by search engines on the Internet so that it may be accessible on a continual basis to others.

Taker Cognizance of Leaver Concerns

Access to the Internet and its wide penetration can benefit Leaver communities and help preserve their cultures. The broad coverage provided by the Internet allows tribal communities to broadcast information that furthers their own agendas by alerting other communities to issues affecting them. The indigenous people of Chiapas, Mexico for instance, are waging their own fight for self-determination by posting details of their exploitation to the Internet. Similarly, an Amazonian tribe had land returned to them after becoming vocal on the Internet about illegal land encroachments. In each of these cases, the support of the national "community" was insufficient to maintain the allegiance of the protesting groups. Many citizens in industrialized nations are seriously concerned with protecting the unique perspectives of Leaver cultures and are willing to put their money where their mouths are in support of tribal interests.

Preventing Anomie

If the digital divide continues to widen, those on the positive side of the division will be looked upon more and more as the oppressors and exploiters of those without access to the tools of the new millennium. This tipping of the balance of knowledge-power could very well lead to alienation and increased social unrest as more and more of the exploited clamor for a piece of the digital pie. (See the collective works of Karl Marx!)
How to Encourage Leavers' Participation

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Policies for Ensuring Universal Access

In the past, the barrier that separated the upper classes from the lower classes was literacy, defined as the ability to read, to write, and to do simple

arithmetic. In the 21st century, however, information literacy is the new requirement for a citizen of the world to be considered educated. But for a person to achieve information literacy, he must have access to the tools, i.e. the Internet and related technologies, to become comfortable with interpreting the vast amounts of information available. The United States government has generally understood the growing importance of information and technology to its citizens' daily lives and commonly bases its policies on the economic benefits of participation in the global network, which reflects the U.S. Taker pattern. Developing nations are also beginning to address these concerns through a series of concerted efforts, although with differing structures and guiding principles than policies in the United States.

Providing access to the Internet for disadvantaged communities in the U.S. is based on the premise that access to computers and computer networks is very unevenly distributed throughout the U.S. population. Specifically, computer access and usage are positively correlated to higher levels of education and income, and gaps in access are widening over time. The digital divide—the divide between those with access to new technologies and those without—has effects that go to the heart of issues concerning economic participation and equity. For example, help wanted offerings are increasingly being carried on the Internet, sometimes on an exclusive basis. If any demographic group becomes excluded from using the Internet, it will also be excluded from the economic benefits provided through participation.

The gap in computer ownership between the upper and the lower classes has widened since the mid-1980s so that now higher proportions of the wealthier segments of the population have computers relative to the poorer segments. Data presented by the National Telecommunications and Information Administration show that an information elite exists, made up of those with access to computers and the Internet. For instance, households with incomes of $75,000 and higher are 20 times more likely to have access to the Internet than those at the lowest income levels, and more than nine times as likely to have a computer at home. A racial ravine exists as well. Whites are more likely to have access to the Internet from home than Blacks or Hispanics have from *any* location. Further, the gaps between White and Hispanic households, and between White and Black households, are now more than six percentage points larger than they were in 1994. The digital divide's correlations with education and income levels have also increased in the last year alone. Between 1997 and 1998, the divide between those at the highest and lowest education levels increased 25 percent, and the

divide between those at the highest and lowest income levels grew 29 percent (US Department of Commerce July 1999). Only nine percent of Native Americans have personal computers in their homes, compared to a national penetration level of 40 percent (Us Department of Commerce March 1999).

A similar digital divide in Internet access exists worldwide. Lower income countries have lower rates of Internet access when compared to higher income countries. In Mexico, a nation of close to 100 million, for example, only about one million people have access to computers and only ten percent of those presently access the Internet (Jordan 1998, pg. 42-46). Africa accounts for about 13 percent of the world's population but just one percent of the world's Internet users as of the end of March, according to the Association for Progressive Communications, a nonprofit group based in Johannesburg. Excluding South Africa (where one in every 177 people uses the Internet), for every 4,123 Africans, there is just one who uses the Internet. In many countries that have Internet connections, access is concentrated in the largest cities and is prohibitively expensive when set against an individual's typical income. In Cameroon, the average civil servant makes $200 a month and Internet usage is about $3 an hour (Hafner 1999, pg. E8). The costs associated with Internet access in such areas are just too much of a barrier.

In the Communications Act of 1934, Congress established a national policy of universal telephone service that extended beyond merely laying the wires and infrastructure to connect all citizens. It included a commitment to making service economically accessible to all Americans. Section 254 of the Telecommunications Act of 1996 expanded the universal service concept from basic telephone service to include access to the Internet for schools, libraries, and rural health care providers. Announcing the vote on these provisions, former FCC Chairman Reed Hundt said in true Taker fashion,

> "Nothing could be more inspiring than the vision of major progress in the global fight against poverty, disease, and misery. Nothing less than that is at stake in our effort to spark sustained, significant, competition-driven growth in our communications and information sector, as ordered by Congress in the landmark Telecommunications Act of 1996. This is about opportunity for everyone" (Hundt 1996).

It comes as little surprise then those countries as diverse as Canada and Singapore are already taking the initiative to ensure universal access for their

people. For instance, all residents in Singapore have access to a broadband connection from their home through the Singapore One network. But so far only about one percent of Singaporeans use the high-speed network even though the government hopes to have half the population regularly using it by 2001 (Kuzmonovic 1998).

Need for New Interface Designs

> "**Understanding technology should be an essential component of global citizenship**. In a world driven by the flow of information, the interfaces—and the underlying code—that make information available are becoming enormously powerful social forces. Understanding their strength and limitations, and even participating in the creation of better tools, should be an important part of being an involved citizen. These tools affect our lives as much as laws do, and we should subject them to a similar democratic scrutiny" (www.technorealism.com)
> -- *Technorealism Principle #8*

How does one address the issue of communication with people from extremely disparate cultural backgrounds? Under normal circumstances, humans are exposed to the value and symbol systems of other cultures when, for example, they share observations about their respective societal rituals. As a pretext to this exchange, however, there must first exist a common vehicle for understanding. In a face-to-face exchange this vehicle might take the form of spoken language or visual cues such as hand gestures and facial expressions. With technology however, what amounts to a surface tension exists between the familiar and the unknown that many find difficult to penetrate. The key to crossing this barrier is a well-designed user interface.

The hallmark of a good interface is its transparency. If an individual from a given background can interact with a device with little or no effort devoted to navigating the space that separates his or her five senses from the task to be accomplished, then the interface is successful. By subtly stepping out of the way and removing itself from the process, the interface is doing its job efficiently by not interfering with the experience. In order to make this happen however, one must build interfaces to the technology that are meaningful to those that use them so as to enable them to freely express themselves and engage in a synergistic exchange of information with the rest of humankind. If Taker users simply teach Leavers to interact with technology in the same manner that they do, what the Takers will receive in return is a somewhat morphed and bastardized version of

their own output—an echo. What we do not need is more redundant information; what we do need are fresh perspectives.

The point where the gap between the info-haves and have-nots will continue to widen, though it is at the perceptual level of just exactly how one relates to the abstract concepts inherent to the exchange of digital information. Those of us who are relatively techno-savvy are quickly learning to become comfortable living with the reality of multiple unresolved data flows. In the modern world one is by necessity required to learn the art of multi-tasking in order to process the multiple simultaneous experiences that drive our daily lives. Many Taker users have become used to a level of input that could very well prove overwhelming to a less experienced person with a different cultural background (Seigler 1999, pg 26).

The interface issue will be especially pertinent for cultures that rely largely on non-verbal expressions for communicating emotions. While this is a difficulty encountered even within the U.S., for developing nations it may well prove to be a terminally discouraging barrier. The conventional techniques by which most of us who are accustomed to the online life relay our feelings through text-based interaction—"smilies" [:-)] and the like—may simply not be appropriate in some cultures. Symbolic conventions such as "smilies" perform a necessary role as textual cues and serve as substitutes for the non-verbal component that we normally take for granted but is so lacking in online contact. Recent advances in the quality of voice recognition software hold some promise for ameliorating this situation.

Different cultures approach their native environment in widely varying ways. Consider the following examples of communication techniques found in non-industrialized, Leaver cultures:

Australian Aborigines

The Aborigines of Australia have evolved over the past 40,000 years in an environment that most of us would concede has very few differentiating landmarks. Yet they knew where they were going because they had a system of marking trails. These trails were called "song-lines" and they were set up in a very deliberate and "poetic" fashion. As with most of us, Aborigines communicate visually as well as aurally, and through the utilization of human-induced scarification of trees and the transformation of their branches into semi-

permanent signage, they overlaid the natural landscape with their own system of navigational poetry. Aboriginal children were taught from a very early age to "sing the landscape." When they had memorized and understood these song-lines, they could use the visual and auditory maps in their head to sing their way from place to place over thousands of miles of, what to most of the rest of us, would be an intractable wasteland. Their extensive use of hand gestures in day to day communication is another example of how an apparently simple method of relaying information can be transformed through an internalized use of symbols into a complex and efficient communications network (1999).

Canadian Inuit

The Inuit culture of the Canadian North is so closely linked to language that if they lost the ability to describe their environment in the words they speak, they would correspondingly lose a significant portion of their ability to maneuver within that environment. In most cultures, this use of language as an environmental mapping mechanism as well as a cultural descriptor is deeply interconnected. For the Inuit however, the importance of a descriptor to the object or relationship that it describes is very tightly coupled. For instance, it is commonly believed that there are at least 20 ways to describe snow in the Inuit language. Without their traditional language, teaching the different types of snow to a young Inuit hunter would be exceedingly difficult, making survival on the open ice a singularly negative proposition for them (1999).

It is a defining characteristic of all Taker cultures to want to overcome their environment by conquering nature. Geography, to a Taker, is not something you coexist with but something you assimilate. Leaver cultures on the other hand, are by nature much more attuned to their environment. They have naturally learned a particular way of interacting closely with nature and, as in the case of the Aborigines, have prospered for millennia as a result. This positive approach to living in the real world can in fact become an obstacle for some when it comes to adapting to an online, virtual world. For example, Sheldon Teitelbaum has observed that "perhaps the greatest impediment to widespread acceptance of connectivity for the Inuit may stem from their gut feeling that using the consensual artificial environment called cyberspace to circumvent, and thereby overcome, geography is an exercise in hubris" (Teitelbaum 1997, pg. 3). Since the Inuit derive their identity through their relationship to the geographic spaces they inhabit, the natural environment does not impress them as a hostile force. Thus, there is no logical reason for them to initiate or even desire a relationship

with the virtual, or engage in what we commonly refer to as an "escape from reality." While many of us who are already on the Net consider the concept of anonymity as liberating, those who pretend to be anything other than who they truly are among the Inuit immediately lose face. Given that this societal construct is fairly widespread across cultures, it is not difficult to understand the suspicion that many non-industrialized people such as the Inuit harbor towards online technologies in general. If access to the digital village can enhance the connectivity of the Inuit in practical terms—their terms—and contribute positively to their culture, then they will use it. If not, then "anyone who has seen an Inuit wait hours, even days, for a seal to emerge from a hole in the ice will realize that these people will patiently await a new generation of tools that can serve their purposes" (1997, pg. 3).

Neoteric Interface Designs

> "**Technologies are not neutral.** A great misconception of our time is the idea that technologies are completely free of bias—that because they are inanimate artifacts, they don't promote certain kinds of behaviors over others. In truth, technologies come loaded with both intended and unintended social, political, and economic leanings. Every tool provides its users with a particular manner of seeing the world and specific ways of interacting with others. It is important for each of us to consider the biases of various technologies and to seek out those that reflect our values and aspirations" (www.technorealism.com).
> --*Technorealism Principle #1*

For cultures other than our own, the best technology is often the simplest by industrialized nation standards. A technology that is transparent and complementary to existing tools will almost certainly be the most effective. In other words, the best technologies are intuitive and the procedures for learning how to use them are deeply buried within the society's cultural practices. Both the Australian Aborigines and the Anasazi of the Southwestern U.S., for instance, used rock paintings as a means of leaving messages for others at prominent locations along their travel routes. The traces they left appear to us as ciphers or a kind of graffiti, but they carry a significant amount of information to those who know how to read them. The creation of these rock paintings is a dying art in contemporary Australia but their deeper meaning lives on in the collective consciousness of the modern day Aborigine. An interface consisting of the standard keyboard and mouse might well prove awkward for an Aborigine to

master but a large format, pressure sensitive flat panel display that could be hung vertically and painted upon by hand might provide a more intuitive means of expression that could enable the same individual to express him or herself fluently.

The perfect interface alone will not eliminate all barriers to the adoption of new technology. The rock painting example cited above is one case in point. Many primitive cultures draw in 2-D only and use literal versus symbolic representations to transmit a particular message. New communication technologies using 3-D representations are considerably more complicated and are becoming increasingly widespread. Those cultures familiar with 2-D representations of 3-D objects on 2-D materials may need training to be able to understand and migrate to a 3-D on 2-D format. Perhaps a design team consisting of an anthropologist, Aborigine, graphic designer, and user interface designer would be better equipped to design a "One World" graphical user interface. Such a team could incorporate their unique combination of technical and cultural perspectives to create a context-based system where the user model becomes identical with what is displayed onscreen.

The most exciting cutting-edge research in human-machine interface design is currently taking place in the areas of voice recognition, haptics, motion tracking, and retinal imaging devices. Edwin Land once said, "Redesign is not so much having a new idea as stopping having an old idea" (Gage 1999). Each of these technologies is being developed in just this way: by looking at the means in which we use our wetware input/output array to interact with the real world and translating that same methodology to the virtual. Over the last few years, the capabilities of voice recognition software have been increasing dramatically. Soon it will be common for users of desktop computers to interact with their systems almost exclusively via voice commands, thus largely eliminating the keyboard from the user interface. The development of haptic technologies, that provide tactile sensing and control through touch and gesture, has finally reached the point where it is becoming commercially feasible to market them at a reasonable cost. More sophisticated force feedback and gesture systems that allow total control and manipulation of virtual objects in cyberspace promise to open a world of possibilities for worker training, education, and adaptive devices for the visually impaired (Hodges 1998, pg. 48). Motion tracking systems for gesture recognition are being developed that will one day allow the hearing impaired to communicate with others online via sign language. This technology will also be extremely useful as a tool for expanding the online communication

capabilities of people like the Aborigines, to whom hand gestures are such an important part of their language toolkit. And finally, research at the University of Washington's Human Interface Technology Lab is readying a device that uses a low-wattage laser to scan 3-D images directly on the retina, thus heralding the future of a monitor-less display. These developments presage a future where "anytime, anywhere" ubiquitous computing is an accepted part of everyday life.

Viable Barriers to Leavers' Participation

Language Obstacles

The majority of the content available online is in English. Online translators are reducing the language barrier for some of the more common languages but likely will not become available for isolated tribal communities whose dialect relatively few people speak. This presents an interesting dilemma: the possibility that a Leaver culture that is willing and able to present their information online may have no audience outside of their immediate community who can read it. A global citizen has very little time or motivation to learn pre-industrial regional languages such as Basque, Romani, and Apache. These languages are the languages of the past—useful to anthropologists for the valuable information they carry about the mores of the people who spoke them. Most modern people however, will never learn them because mastery of such languages, to an outsider at least, provides no survival advantage.

In *The Death of Memory*, Bruce Sterling ruminates on how across the world today, small, local languages are dying out at an alarming rate. These mass extinctions are primarily a post-industrial phenomenon: the cultural equivalent of the mass extinctions that are simultaneously occurring in nature at a global level. It is his assertion that we are losing something that is extremely difficult to quantify but nonetheless of great importance to our future. When a language dies, the world also loses a vital aspect of the memory of the people who lived that language. The UNESCO Red Book of Endangered Languages says that better than half of the 94 languages on the European continent are endangered. Each of these languages carries with it a unique worldview—a gestalt of the reality of the people who speak it, their perspective on life that is truly irreplaceable. English is the great, globalized language that is primarily responsible for steamrollering all the other languages (Sterling 1999).

One promising estimate indicates that the amount of non-English language material available on the Web is growing dramatically. Indications are that by the year 2003 more than half the content on the Web will be in a language other than English, up from 20 percent today (Helm 1999). In addition, improvements in translation services (both human and machine) and browsers that recognize the character sets of different languages will greatly expand the amount of content usable by the entire worldwide Internet community.

Distrust Based on History

Historically, Taker cultures have exploited Leaver cultures by exporting resources without providing anything in return. The distrust that has accumulated as a result of these actions is warranted and must be overcome if those communities are to participate effectively in the give and take of the Internet. For instance, some Inuit fear the inherent openness of the Internet because outsiders exploiting their willingness to share information have burned them so many times in the past. Southern visitors have ripped off all kinds of traditional knowledge, from parka patterns and insights into animal migratory habits, to the locations of mineral deposits (Teitelbaum 1997). The idea of using the Internet as a repository for traditional aboriginal skills is very attractive but the lack of either credit or compensation for past favors tempers Inuit enthusiasm from placing any traditional knowledge on any database accessible to others.

Technological Hurdles

Although 94 percent of Americans have a telephone in their home, relatively few people in the world have ever used one.[1] This is due, in part, to a lack of terrestrial telephone cabling in developing nations. Since a large percentage of Internet traffic flows over telephone lines, a lack of telecommunications infrastructure in Leaver communities makes it difficult to expect them to be able to use the Internet.

However, advances in wireless technology are expected to overcome infrastructure barriers to Internet diffusion in some regions of the Planet. As an orbiting satellite system can potentially reach all geographic areas, wireless Internet has the potential to bypass the requirement for terrestrial cabling. Some

[1] For more statistics, see the National Telecommunications and Information Administration website at http://www.ntia.doc.gov.

companies and political institutions looking to accelerate network diffusion in Africa have proposed increased reliance on wireless telecommunication systems, connected by Low Earth Orbit (LEO) satellites, which would not depend on legacy systems of fiber or copper. But these networks depend no less than wired networks on a reliable power grid, which is often times unavailable in areas with low telecommunications infrastructure. And maintaining the infamous "last mile" of wire or fiber between the downlink station and the desktop will likely prove even more troublesome in Africa than it has in the developed world. The underlying technologies of wireless communications are also more complex, technically fragile, and costly to set up and administer than those of traditional wired networks. Moreover, the economic restructuring resulting from increased reliance on wireless networks could prove catastrophic for the African nations that currently depend on the export of minerals widely used in wired infrastructures.

Probing the New Millennium

As we enter the new millennium, it is generally assumed that almost everything we do in industrialized nations will be absorbed into the digital "infosphere"—as in IBM's advertising phrase "Connecting everything to everything." The steps leading to this development have progressed rapidly as we proceed from universal service (ensuring that all citizens can access the infrastructure necessary to connect to the telecommunications system, if they so choose); to universal access (ensuring that all citizens are connected); to ubiquitous computing (when the Internet will be present in everything and everywhere). This third model is also known as the "post-PC" era, when embedded devices will permeate our homes and everyday objects such as refrigerators, telephones, cars and stereos. In the 21st century, the need to clearly evaluate the intersection of technology, society, and policies concerning digital communication technologies will be more pronounced as these technologies increasingly saturate daily life.

In a time when the United Nations Development Programme issues its annual Human Development Report in 1999 that says “Global inequalities in income and living standards have reached grotesque proportions," it is clear that Taker cultures are exploiting the Earth’s resources for their benefit at the expense of Leaver societies. According to this report, the richest nations of the world have only 20 percent of the population, but 86 percent of the income, 91 percent of its Internet users, and 74 percent of its telephone users. The 20 percent living in the

poorest countries, such as Ethiopia and Laos, have about 1 percent of each. The largest Taker country, the U.S., has more computers than the rest of the world combined—and while a PC costs approximately one month's wages for an average U.S. citizen, the same computer takes eight years' income from an average resident of Bangladesh (United Nations 1999).

Although relying solely on economic considerations for Leaver communities to become involved in the global Internet is inappropriate, there are clear economic incentives for Leavers to present themselves online while benefiting the whole Internet community (comprised of Leavers *and* Takers) from multiple perspectives, exposure to Leaver concerns, and prevention of anomie. Designing appropriate interfaces may be one way to effectively increase participation and to use technologies in a manner consistent with Leaver goals—as tools for assisting humankind in its co-existence with the natural environment. A fully participatory Internet offers the possibility of reducing the negative effects of Taker exploitation of Leavers as Takers learn from Leaver cultures.

We are in the unique position of being able to acknowledge and perhaps rectify (before it is too late) the impending tragedy of the commons as it relates to Internet participation. Garrett Hardin's classic essay, “The Tragedy of the Commons,” develops the thesis that it is to an individual's advantage to exploit a common resource as thoroughly as possible, and that the implementation of this strategy by many individuals leads to exhaustion of the resource. "Freedom in a commons," says the essay, "brings ruin to all" (Hardin 1968, pg. 1243-1248). The current Taker users of the Internet, sharing its network as a common resource, are exploiting it for personal gain, which may result in it losing its value for all users. As content on the Internet becomes redundant and focused towards a particular group, i.e. Takers, we are in danger of undermining the Internet’s effectiveness as a communications tool. Instead of encouraging the global perspective on issues affecting both Leavers and Takers, the Internet is quickly becoming a mass marketing device for companies in Taker cultures with little or no utilitarian value for Leaver societies. As the Xerox study indicates, only a small percentage of Internet sites receive a majority of the hits. As such, the Internet may soon suffer the consequences of the tragedy of the commons as Takers extract only the information they want without contributing in some manner to the sustainment and value of the overall system. A concerted effort to include Leavers is necessary if the Internet is to live up to its potential for bridging dichotomous world perspectives.

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