Smart Mobs: Their Pervasive Computing in the Wireless Age

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Communication technology, whether it is mobile phone use, email or instant messaging, holds near fetish popularity throughout a great percentage of the population. With increasing levels of pervasiveness, advanced computing technology and knowledge management tools affect the general population, with and without their conscious knowledge, on a daily basis. The breadth of knowledge management tools, from mobile phones to online banking to instant messaging to virtual offices, that are easily accessible to the general population is overwhelming. The technology becomes more overwhelming when one considers the fact that, as the tools become more readily available and integrated into daily life, most people interact with a variety of knowledge management gadgets more sub-consciously than consciously.

Howard Rheingold coined the term “smart mobs” to define those who are living in this new state of always-on connectedness. These smart mobs are not crazy scientists or the wealthy elite, rather they include people who use in-store discount cards that track purchase trends in exchange for nominal discounts in grocery stores; kids calling dad on the family-service mobile phone for a ride home from the mall; families sharing stories over hundreds of miles, in real-time, through the use of web cams and VoIP applications such as Skype; thousands of people entertaining themselves in the world of online games ranging from Final Fantasy to PlayStation’s SOCOM: US Navy Seals. Smart mob members include grandchildren using a laptop and WiFi connection, from the comfort of a couch, to help grandparents learn about medications online. For the grandparent, this may be an exciting experience, but the grandchild sees nothing exciting about the fact she can take the laptop all over the house. She expects to be able to instantly access the world through the Web because the technology has pervaded her daily life on a general, subconscious level. For much of today’s suburban youth, this kind of technology is merely a functional tool that is expected to exist within close proximity of daily life. However, there is a great deal of the population that is not in close proximity of technology. As the infrastructure of pervasive and WiFi technologies continue to be developed, those who are on the edges of the connected populations must be included in the infrastructure development because, at the present rate of innovation, there will come a time in the not-so-distant future when connectedness (wireless or otherwise) will be key to social, economic and political success.

In the arenas of business and knowledge management, the ability to not only be connected but to accomplish tasks through interconnectedness is becoming nearly mandatory. From workers tracking their activity through computer software timekeeping programs to companies that have

begun adding a service charge if bills are not paid electronically, one can easily see that smart mob technology is not simply a homegrown, community tool. Due to the fact that computers are becoming more pervasive in the corporate world it is even more important that today's youth be able to access technology and learn to operate and manipulate computing systems in all areas of their life, from education to recreation. Without the tools of technology children cannot learn the language of technology. Without fluency in the language of technology the youth of today will be the unemployed of tomorrow.

"A new kind of digital divide ten years from now will separate those who know how to use new media to band together from those who don't" **Rheingold, *Smart Mobs,* p. xix**

The pace of technological advancement makes many tools obsolete before the average consumer can master them. Due to technology's trend to steadily outgrow itself as it evolves into new forms, members of a generally tech-minded population often find themselves working to learn a system that is quickly leapfrogged by a new system version, claiming to be the "new and improved" iteration of the original system that the consumer is still trying to figure out. This constant leapfrogging is exciting in that new, dynamic ideas are always being generated, but it is also a frightening proposition because few people (at the average consumer level) are ever adequately trained in technology, to the point that a system becomes truly comfortable, before a new system version is released. Examples of constantly changing systems include software such as Macromedia's Dreamweaver, Apple's iMovie, and Windows operating systems whose programmers develop upgrades every year or two, reorganizing interfaces at varying levels from minutia to widespread system functionality changes. However, it is not only a constant stream of software updates that create a technological bottleneck, but also the simple fact that corporate innovators of technology often fail to make proprietary systems interoperable at any level.

The development of pervasive computing often focuses on end users[i] experience while alienating the fact that for technology to become truly pervasive hardware and software must be interoperable. In order for vast interoperability to realize itself there must be a semblance of uniform standard that will connect various developers through the languages of their core product development. Grimm, et al "argue for a single application programming interface (API)" to be developed for cross-platform technology. An API is a series of functions that allow operating systems to perform multiple tasks through a single instruction.[ii] By integrating APIs into a variety of devices that would be part of a pervasive computing system, the API would allow for the core of many applications to be developed once and then distributed across several platforms.[iii] Presently, APIs are often found under single operating systems that do not have interoperability with

similar systems. For example, knowledge management devices like the Treo, or mobile phones that cannot automatically connect internationally due to competing telecommunication standards, could converge into one standard if not for proprietary stubbornness. The standards must become neutral towards each other in order to facilitate expansion throughout the hi-tech industry.

On the surface, the idea of uniform APIs goes against the grain of innovation because it appears that many systems would have to be bottlenecked into one design. However, the reality is that by creating a single adaptive core system language, that would allow cross-communication between technologies, developers would be more available to create new means and uses for the technologies. In theory, as a few boundaries are set to create a cooperative computing language the "big picture" can be addressed to allow for the development of greater cross platform, pervasive computing systems. Therefore, a set of interoperable APIs have the capability to create an eruption of new ideas, technologies and systems, because engineers and designers will be able to explore opportunities generated through an interconnectedness between technological innovations. Many companies seem to fear that opening up their ideas will come at the cost of financial detriment. However, releasing proprietary ideas and schematics will trigger broader competitive development; and, therefore, new innovation will occur between companies. The idea of shared ideas creating new innovation is not new. One only needs to look to Apple's open source Darwin project[iv] to see how allowing people to work with few boundaries can foster innovation and corporate success. More recently, user generated content sites such as flickr.com have proven user generated applets and software development increase commercial success, proving that proprietary openness can transform potential competitors into loyal allies.

As pervasive computing becomes more attractive to the consumer, companies will have to release details of many proprietary system specifications, or at least follow Apple and flickr's example and create open source forums in which developers can share ideas. This open idea exchange is requisite for the advancement of pervasive computing, without an open exchange of ideas between corporations, users, and developers the future reality of the ideas of limitless pervasive computing will remain in the fiction of Bruce Sterling.[v]

"These devices will help people coordinate actions with others across the world" **Rheingold, *Smart Mobs,* xii**

Philip Agre[vi] discusses the idea that social institutions are partially defined by their place. As knowledge management technologies become increasingly flexible and pervasive the traditional

ideas of space (physicality of social institution) becomes archaic and new theories of place must be contemplated. No longer does location, time or environment tie people to the availability of information that is vital to their work, personal or familial personas[vii]. This transformation in the processes of knowledge management, from mandatory physical interaction to more ephemeral options, leads one to question what becomes of social institutions when physical space is removed and knowledge management becomes pervasive. The transcendence and manipulation of time and place pique social quandaries regarding the effects of new pervasive technologies. Will social institutions become more invasive in regard to private lives due to the lack of privacy that will ensue with increasingly pervasive technology? Or will privacy become more respected as a result of the veil of intrigue being removed from previously difficult to attain, personal information? Will people guard time-honored traditions or will the new technologies encourage vibrant transformation of social norms that will be unrecognizable to former mores? The explosion of social networking sites, from myspace to Twitter, while possessing their own set of social questions, indicate a re-birth of social norms is the most likely result of the changing physical parameters of technology.

In the early years of cyberspace the user's space was critically physical. In order to obtain connectivity a person had to be plugged in and mounted to one location to access cyber computing technology. However, as wireless computing becomes more pervasive the "cyber" in cyberspace is becoming a reality. People no longer have to be tied to a desk or home to receive a phone call, send an email or even have a visual communiqué. Instead, people can make a phone call while they walk down the road, check e-mail on their laptop or mobile phone in a café or have a 'face-to-face' discussion using a web cam and VoIP. As cyber life becomes more natural to the average, everyday-citizen end user, real-time place becomes less necessary to community than the traditional model of the send-wait-receive response system of knowledge transfer. This time-place phenomenon demonstrates a shift in the paradigm of communication between communities of friends and strangers alike.

Communication technology has not only altered business and social functions; it has also expanded the networking possibilities of grassroots political movements. The vast networking abilities of smart mob communities have been witnessed through protest events against the World Monetary Fund (WMF), the United Nations, and during the Bush administration's pre-emptive planning of the war with Iraq. The always-on protests were exemplified through the planning of anti-war rallies, petition signings, and hundred of thousands of individuals voicing general dissent toward the Bush administration. For those deployed during the pre-emptive planning, smart mob technology was in action as well. The level of connectedness ranged from the satellite

feeds for communication between reporters and stations to generals and central command to the drone spy aircraft that were operated by Special Forces to scout destinations from afar. However, even at points in warfare there will be times of pause and these times now allow for soldiers to visit with their families from afar. Soldiers from Ft. Hood, Texas were able to access videoconference technology to visit with their families that were back at home and many who were interviewed spoke of how email has eliminated most traditional letter writing.[viii]

Although the Bush administration went forth with the war, the immediacy and power of the citizenry networking demonstrated the true power that smart mobs hold in their ability to use the knowledge management tools to access and connect enormous numbers of people, with great speed, across the planet. Quickly, across the planet or between towns and villages that were previously politically separated, wireless technologies are changing the way the world communicates and organizes change. In 2001, the Philippines witnessed a political overthrow that began with the mobile text message "Go 2EDSA, Wear blck." This message spread across the country and in less than a week over a million people gathered at a Manila park to protest President Joseph Estrada.[ix] He fell from power, in great part, due to text messaging. In Africa the use of mobile phone is increasingly in step with the liberalization of radio airwaves. These coincidences are also in conjunction to increasingly democratic elections that are ousting long-time ruling parties. Citizens at polling places use mobile phones to call radio stations to broadcast the vote counts and people can hear, village by village, what is happening to their political landscapes. In 2001 Ghana's ruling party held onto their offices only in remote areas that did not yet have commercial radio.[x]

With the introduction of new technologies there are always effects to the society that accepts the technology. Some of the changes that will follow the introduction of new technology can be anticipated, others cannot, but the ultimate reality is that when an interesting, adaptable new technology is introduced people will embrace it and behavior will be modified to fit the technology into daily life. In Pakistan, Afghan Moslem youth are able to have private virtual relationships via mobile phones when previously they would not have been allowed to be alone together in any manner.[xi] This cultural shift is horrifying to many Moslem parents but, as an unexpected result of new technology, this community must address this shift in values that certainly was not anticipated when mobile phones were introduced to the community. The traditional Japanese cultural taboo of lateness has been shattered by youth who embrace the freedom provided through mobile phones. Now, as peoples' schedules can morph and shift with a moment's notice via a quick mobile call or text message to change meeting times, the new taboo is to let your mobile phone (*keitai*) battery to lose its charge.[xii] In Japan people are no longer chronically con-

cerned with being late because place and time have been transcended through accessible communication. As is apparent, new technology is transforming social customs and political systems across the planet. With every community that is touched by new technology different, unexpected uses are found for the technology and a plethora of consequences result throughout each group that adopts the technology.

"The surveillance state that Orwell feared was puny in its power in comparison to the panoptic web we have woven around us." **Howard Rheingold, *Smart Mobs,* xxi.**

New cars often come standard with Global Positioning Systems (GPS); GPS technology is now being integrated into many mobile phones; and you can even track your pets with a digital angel tracking device (http://www.digitalangelcorp.com/). Web cams can be combined with voice over IP and a dedicated Internet line which can allow people in multiple locations to have an always-on connection to each other through both visual and audio connections. This type of always-on panoptic ability is frightening to many because the question of who can observe the GPS users' movements is largely unanswerable due to constantly changing security protocols and questions of what the definition of personal privacy covers. Others are comforted by panoptic technology because they feel a more solid sense of connection to family, friends and colleagues when they can easily contact a person digitally. The irony of it is that no one has forced this technology on the general population. Instead, it has appeared rapidly and, with good marketing and decent product quality, people have grabbed up the tools that give them the always-on access to smart mob membership. We are becoming great connoisseurs of pervasive technology whether we are avid tech-geeks, average computer users or even the occasional non-wired individual. Wireless headsets and remote controls are all part of pervasive computing. When pervasive computing is discussed, thoughts often quickly lead to ideas of smart cars and talking houses instantly come to mind but pervasive computing is much more, well, pervasive. In my mind, pervasive computing is any computing that is second nature to a user. When you do not think of the 'tech tool' you are using to do a job but rather just do the job you are experiencing pervasive computing. For example, when you pick up the remote control to change a TV channel you do not think, "I am going to pick up the remote so it can transfer signals in order to change the channel." No, instead you simply decide to change the channel and you click the remote. Sometimes you do not even consciously think about what you've done until you realize ten minutes of channel surfing has occurred. This unconscious acceptance of the ever-present technology that exists in society is the basis of what pervasive computing is all about.

Conclusion

The levels of connectedness without conscious awareness are quite remarkable. I am not stating an opinion that it is good or bad to be broadly open to the always-on phenomenon, rather I am speculating on the effects of the phenomenon of increasing pervasiveness. Not only is technology pervasive in our constantly evolving array of personal knowledge management tools but we are also witnessing an explosion of connectedness from the workplace to entertainment. Some of these technologies are wildly successful while other may or may not catch on throughout the general population. However, for any technology to find success it must have an audience that is willing to learn and grow into the use of the new technology. Additionally, emerging technology must fill a need, perceived or actual, that creates the technology's necessity. Finally, the technology must be relatively affordable to the average citizen in order to germinate within the populous, ultimately growing to a wide spread success.

As I write this on my Mac PowerBook, which harnesses more power than a nearly any computer did thirty years ago, it is connected to the Internet via a wireless card, allowing me to have a browser open in the background, instant messaging activated in case one of my long-distant friends wants to say hello, and immediate access to an online dictionary. Additionally, I am listening to a great compilation CD that was previously mixed, on said computer, from a variety of music CDs and downloads. Finally, I have my tiny mobile phone out and set on silent so that I can receive calls from project group members and my sister when she arrives in town. The great (perhaps ironic) thing about all this connected comfort, including music, is that I am in the quiet, distraction free locale of the library because there are too many distractions to my work at home. Moreover, as I look around, I realize I am not alone. I see headphones on the heads of my fellow smart mob members who are furiously typing and then pause to answer a instant message, grin at a reply, and return to their work; occasionally a mobile phone will beep and someone will get up to take a call and then return to work. I see pervasive computing all around and yet I know that what we experience today is but a shadow of the technology that awaits us on the horizon of our cyber future.

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Endnotes

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[ix] Rheingold, pp 157 – 158.

[x] Ashurst, Mark. (Aug 27, 2001) Newsweek. *Africa: Now, a 'Quiet Revolution': Mobile phones leapfrog an obstacle to development*.

[xi] Rheingold, p. 21.

[xii] Rheingold, p. 5