

ETHNOGRAPHY AND THE EMPOWERMENT OF EVERYDAY PEOPLE

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ABSTRACT

The use of applied ethnography as a research methodology contributing to the software development process is a relatively new phenomenon. This white paper examines the relationship between the integration of ethnographic research in the software development process at Microsoft and the empowerment of end-users of Microsoft products. The study is based on 17 interviews with subject matter experts conducted during a site visit to Microsoft headquarters in Redmond, Washington, in March, 2004, and on an analysis of processes and materials related to ethnographic research in Microsoft's product development cycles. Findings demonstrate that ethnographic research plays a critical role in the software development process at Microsoft. The anthropologists and ethnographers at Microsoft conduct research at all stages of the software development cycle that is open-ended, exploratory, located in natural settings, and that aims to discover the point of view of the end-users being studied. Specialized training in ethnographic methodologies enables the researchers to understand and integrate into the software development process the perspectives of end-users whose geographic, socio-economic, and cultural contexts may be very different from those of the software developers. In the broader context of facilitating empowering user experiences, the combination of ethnography and usability engineering delivers results in products that make the technology easy to use, enhance joy of use, and fit the socio-cultural context of everyday people at work or at home, leading to the empowerment of end-users on cognitive, emotional, and socio-cultural levels. Ease of use is critical to user empowerment because products that are easy to use produce positive emotional responses such as feelings of confidence, competence, and productivity. Additionally, products that reflect the perspective of the user (in geographic and linguistic representations within the product, for example) empower users by creating comfortable and non-alienating computing experiences. The study concludes that the incorporation of ethnography into the software development process is a major contributor in the transformation of Microsoft from a technology-driven to a human-centered company.

ABOUT THE AUTHOR

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Dr. Sanders is President of SonicRim, a design research firm. She is a pioneer in the use of participatory research methods for the design of products, systems, services and spaces. Dr. Sanders speaks about and teaches human-centered design to students, clients and colleagues around the world.

Dr. Sanders's numerous design awards, patents, publications, presentations, and her proven track record in the marketplace have established her as a leader in the field of design research. Dr. Sanders's client relationships have included 3M, AT&T, Apple, Baxter, Ciba Corning Diagnostics Corporation, Coca Cola, Compaq, Hasbro, IBM, Intel, Iomega, Johnson Controls, Kodak, Microsoft, Motorola, NBBJ, Procter & Gamble, Siemens Medical Systems, Inc., Steelcase, Texas Instruments, Thermos, Thomson Consumer Electronics, Toro, and Xerox.

Introduction

When developers design software for themselves, the product empowers developers like them. Such is the case with the Linux community. On the other hand, when multidisciplinary teams design software from a human-centered perspective, the product empowers everyday people at work, at home, or at play. Over the past 20 years, by relying on increasingly multidisciplinary software development teams, Microsoft has been transforming from a developer-driven organization to an organization that is becoming more human-centered and more empowering of its end-users. Ethnographers play a crucial role in the software development process at Microsoft today. Their contribution comes into play iteratively throughout the process and the consequences can be felt on a number of different levels.

This paper will first provide some background on ethnography and applied ethnography. It will then describe the history of applied ethnography at Microsoft. The contributions that ethnography provides to the software development process at Microsoft will then be discussed from four perspectives:

- ~ The cognitive context in which users live and work,
- ~ The emotional context in which users live and work,
- ~ The socio-cultural context in which people live and work, and
- ~ Changes in the software development process.

This paper will show how the application of ethnography to the multidisciplinary software development process makes unique and crucial contributions to the product and the process of software development, resulting in end-user empowerment at several levels: cognitive, emotional, and socio-cultural.

What is ethnography?

Ethnography involves the description and study of human cultures. Social scientists use ethnographic methodologies in order to better understand people through the perspectives and practices of their cultural and social contexts. Effective ethnography depends on the researcher's de-centering his or her own perspective as much as possible. The use of ethnography originates from the discipline of anthropology, wherein anthropologists spend significant periods of time with local people making detailed observations of their lives and their practices. Traditional ethnographies are often done by individuals and can take several months to years to complete. In the field of applied ethnography, ethnographers use their research methods to bring the consumer's point of view to the design and development of new products and services, and to improve existing products. Applied ethnographies may be conducted by small groups of people and are generally done within a much shorter period of time, ranging from a few days to a few months.

Ethnography can be described by a number of characteristics. For instance, it usually:

- ~ Takes place in natural surroundings (as opposed to the laboratory);
- ~ Is open to change and refinement throughout the process as new learning shapes future observations;
- ~ Combines a range of research methods, including observation and open-ended forms of inquiry;
- ~ Has a goal which is more likely to be exploratory rather than evaluative; and
- ~ Aims at discovering the point of view of the person or group being studied. People studied in the context of applied ethnography are generally potential consumers or end-users of new or existing products.

A very short history of ethnography in industry

The application of ethnographic research methods to the software development process is one instance of a larger trend—the application of the applied social sciences to the design development process. Although it is not really a new form of research, the application of ethnography is relatively recent.

Xerox was probably the first company to use applied ethnography in the product development process (Reese, 2002). The company hired Lucy Suchman, an anthropologist at the Xerox Palo Alto Research Center (PARC), in 1979. Suchman conducted ethnographic fieldwork in the workplace and summarized her findings in a film showing office workers struggling to do a copying job on a Xerox machine. After viewing the film, Xerox engineers began to think about designing Xerox machines differently. One of the results of Suchman's work is the large green button we see on most copiers today that lets us walk up to the machine and easily make a copy.

In the early 1980's, several of the larger industrial design firms hired anthropologists and/or psychologists to bring the human-centered perspective into their new product development process. Today there are a number of social science-based research consultancies and many individuals who offer a psychological and/or anthropological perspective to product development teams. Although applied psychology made an earlier impact than did ethnography, companies such as Xerox, Intel, Motorola, and Microsoft now have full-time or part-time ethnographers on staff in addition to the applied psychologists.

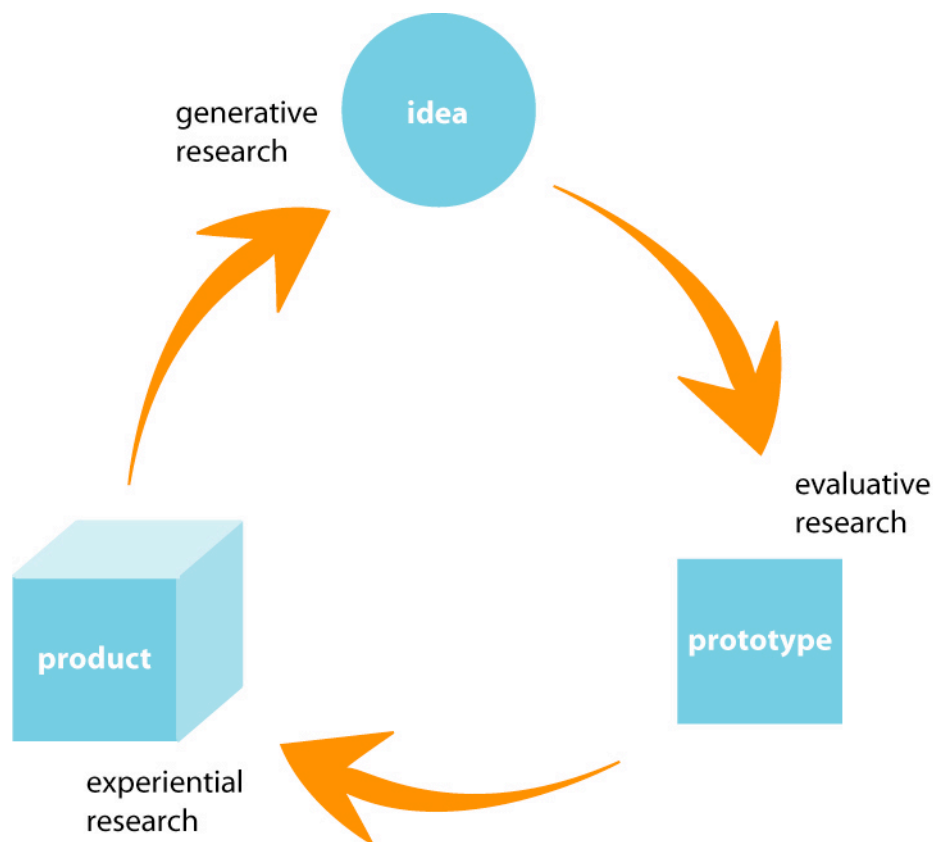
Ethnography has, in fact, become somewhat of a buzzword in the new product development arena, with many market research firms and advertising agencies attempting to jump on the bandwagon. There is a tendency today for any form of contextual research (*i.e.*, research that takes place in natural surroundings) to be labeled ethnographic, whether it meets the characteristics of ethnography listed above, or not. Although people not trained in anthropology can become involved in the ethnographic research process, it is best that the research be led by someone with training in the field since the mindset about the people being studied is such an important influence. Even more important is the fact that people trained in ethnography have the theoretical perspective from which they can see the underlying patterns and understand the deeper meanings in what is observed and heard. It is this kind of perspective that is needed for breakthrough thinking to occur (Sullivan, 2004).

How is ethnography used in the product development process today?

Ethnography is useful throughout all stages of the new product development process. Ethnography can be used at the earliest stages of the process, often referred to as the “fuzzy front end,” to explore emerging and unmet needs of people at home or at work. Ethnography is an in-depth and open-ended approach that can reveal what is really important to people. This understanding can help alleviate the risk involved when going after a new market or bringing to market a totally new product or service. Ethnography can be used to validate product concepts or prototypes at various points in the software development process. Because ethnographic research takes place in natural surroundings, product validation is as close to the real situation as possible. Ethnography can also be used to understand how people live with and experience existing products or services, and the insights from this use of ethnography can then be applied to product refinements or next-generation products.

The history of ethnography at Microsoft

In looking at the history of ethnography at Microsoft, it is useful to understand the state of user-centered research at Microsoft at the time ethnography was first introduced.



This diagram shows a simplified view of the new product development process and can be used to talk about the design development of all types of “products”: hardware, software, systems, and spaces. Products start as ideas that are

transformed into one or more prototypes, which eventually become products. The research that feeds each of these stages differs in intent and in form. Research done to assess prototypes is called evaluative research. Research that is done to explore what happens to products when they are used by people in the real world is called experiential research because it is focused on exploring experience. And finally, research that is conducted in order to generate ideas or to uncover new product opportunities at the fuzzy front end is called generative research.

Phase 1: Evaluative research at Microsoft

The earliest application of social science expertise to the new product development process at Microsoft came in the form of evaluative research (*i.e.*, usability engineering). The role of the early usability engineers was to evaluate the ease-of-use of Microsoft's products and prototypes. In fact, the act of building prototypes in order to inform the creation of better products was an idea that grew out of the interaction between software and usability engineers. Microsoft was a pioneer in usability engineering, with a team of four people doing usability engineering in 1988. This was a time when the usability field did not yet exist and there were no universities in the United States that trained people to work as usability engineers. Today there are many graduate programs (based in either applied psychology or human engineering) that train students for careers in usability engineering.

Today there are about 150 full-time usability professionals working at Microsoft, supported by many outside usability consultants. They conduct iterative evaluations of a continually evolving array of product prototypes. Most of their work is done in the laboratory under controlled settings. They may also evaluate prototypes in the home or in the workplace since they recognize the importance of understanding people's experiences in the context of use. But the focus of most of the usability engineers remains product-focused and this does not permit them to really explore more generative forms of research.

Phase 2: Experiential research at Microsoft

One of Microsoft's first anthropologists, Anne Cohen Kiel, was hired in 2000 by Kent Sullivan (who was then the head of Usability Engineering for Windows) to be a member of the usability group working on Windows XP. Trained both in psychology and anthropology, Anne's role was to focus on evaluating prototypes in their contexts of use. Having had previous experience in conducting ethnographic research, Anne immediately knew what to do in "the field."

It was not long before Anne took the initiative to begin the Real People Real Data (RPRD) program. Anne recruited families who were willing to be observed while a small team from Microsoft went with them to purchase a new computer, bring it home, and then set it up. RPRD grew into a longitudinal field study of Windows XP, where Microsoft team members visited periodically with 40 U.S. families living in their homes in order to generate distinctive feedback across hardware and software products. Anne recently started an RPRD program in MSN where she now works.

Anne also was quick to start the internal evangelization of ethnography that continues today. In an internal white paper, she advises:

"For ethnographers at Microsoft, the goals are to:
– *Observe our users from their point of view, NOT Microsoft's point of view.*
– *Find out what our users really want and need in Microsoft products (NOT what Microsoft thinks they want and need)."* (Kiel, 2002)

The distinction that Anne introduces in her white paper is the emic/etic distinction. The "emic" perspective focuses on the intrinsic cultural distinctions that are meaningful to the members of a given society. The "etic" perspective relies upon the extrinsic concepts and categories that have meaning for scientific observers (Barnard and Spencer, 2002). Ethnographers bring the emic perspective to the multidisciplinary team. This is a crucial perspective that is necessary for human-centered design. Cognitive scientists bring the etic perspective.

Phase 3: Global ethnographic research at Microsoft

At the end of 2002, Tracey Lovejoy and Nelle Steele, two ethnographers working in Windows, expanded their fieldwork to include non-U.S. locations, and they are now conducting ethnographic research globally in order to understand the needs of the international marketplace. This is where the greatest impact of the use of ethnography is likely to be felt in the future since over 50 percent of Microsoft's products end up in the hands of its international users. And the majority of international users, in some countries such as Brazil, may be novice users whose needs for ease-of-use are especially critical.

While other extensive field research has been done at MSN in countries such as Korea, Japan, Spain, Netherlands, Norway, and France, Tracey and Nelle have started their in-depth study called Windows to the World with Brazil, Finland, and India. They completed two to four weeks of ethnographic research in each country, and have disseminated their findings widely upon their return from each country.

Phase 4: Generative research at Microsoft

Microsoft's ethnographers have also become more involved in the generative phase of the development process and are being called upon to contribute to a deep understanding of the people who will use Microsoft's products in the future. It is in the generative phase that the unique mindset and talents of the ethnographers can be seen most vividly. Their open-ended approach, with its multitude of methods and its emergent learning process, lends itself extremely well to the exploratory thinking that is characteristic of the generative phase.

Recently a portion of both Nelle Steele's and Tracey Lovejoy's (the two ethnographers now working in Windows) time has been devoted to begin seriously thinking about what comes next for Microsoft, specifically in terms of a version of Windows that will not ship until 2009 or 2010.

Anne's time in MSN is now split in three ways: one role is strictly internal where Anne works more as an organizational psychologist, observing the internal communication of the product teams and making recommendations about how things could work better. Her second role is top-down and involves vision strategy work for MSN with leadership committees. Her third role is bottom-up and involves using

ethnography both to come up with new ideas for products, services, and features and well as to impact products, services, and features already in development. For example, Anne has recently started a project called Around the World in Participatory Design. Here, users work together with an interdisciplinary team from MSN to understand their aspirations and motives and to explore ideal products for the future. The themes from these sessions are being incorporated in MSN product planning and development. So far, the team has done participatory design in Seattle, Spain and the Netherlands.

Looking back at the new product development process diagram, one can see that the addition of ethnographers to the research effort has completed the circle, laying the groundwork for human-centered design.

What has ethnography contributed so far?

Ethnography has been instrumental in helping Microsoft transform from a developer-driven organization to an organization that is becoming more human-centered and more empowering of its end-users. Human-centered design is design that meets the needs of all the stakeholders in the software development process. It meets the needs of the end-users by developing a profound understanding of their cognitive, emotional, and socio-cultural contexts.

Human-centered design meets the needs of the members of the software development team as well. It ensures that both the emic and etic perspectives are brought into the development process at appropriate times. Being involved in the human-centered design process often changes the team members in significant ways. For example, they may change from seeing end-users as "subjects" to seeing them as real people who also play a very important role in the software development process.

The cognitive context of end-users

Cognition refers to thinking. Cognitive scientists study attention, perception, and memory, and they conduct experiments to understand how people learn, think, read, comprehend, reason, make decisions, etc. (Gardner, 1985). People need to understand the world they live in so that they can function effectively and live productive lives.

Usability engineering is the application of engineering thinking to user experience and behavior. (Wixon, 2004; Whiteside et al., 1988) Usability engineering helps to ensure that the end-product of the software development process is easy to learn to use and can be used effectively both by novice and more experienced end-users. Ease-of-use is the result of usability engineering that is applied iteratively throughout the software development process.

There are many different sources that describe the key components of usability/ease-of-use. One, by Jakob Nielsen, that is most often cited, looks at usability as having five quality components:

- ~ **Learnability:** How easy is it for users to accomplish basic tasks the first time they encounter the design?

- ~ **Efficiency:** Once users have learned the design, how quickly can they perform tasks?
- ~ **Memorability:** When users return to the design after a period of not using it, how easily can they reestablish proficiency?
- ~ **Errors:** How many errors do users make, how severe are these errors, and how easily can they recover from the errors?
- ~ **Satisfaction:** How pleasant is it to use the design?" (Nielsen, 2003).

When products take into account the cognitive context of end-users, the products:

- ~ Are easier to learn to use,
- ~ Are easier to use by both expert and non-expert end-users,
- ~ Feel intuitive in their use to the end-users,
- ~ Make sense to end-users (*i.e.*, there is a match between the software system and the user's world), and
- ~ Are forgiving of errors made by the end-users.

The work of the usability engineers at Microsoft is focused on developing software products that deliver ease of use. Ethnography also contributes to improved ease-of-use in a number of ways. For example, because ethnographic research is contextual (*i.e.*, taking place in natural surroundings), usage scenarios that were not a part of the usability testing become apparent. For example, Dennis Wixon, who is a Usability Manager in MSN, recalls a small but critical discovery that emerged as a result of the RPRD ethnographic studies. This had to do with an automatic preview function that automatically opened up pornographic spam emails that the user did not want to see. It was quickly fixed. He pointed out that ethnography can often reveal problems that usability testing does not cover because in more open-ended ethnographic studies, people try out all types of scenarios. In usability testing, only a subset of the most frequently occurring scenarios can be studied in depth.

Ethnographic research can reveal mismatches between the software interface and the end-users' world that may seem subtle at first glance, but can make a big difference in people's perceptions of ease-of-use. For example, people around the world have different ways of parsing their addresses. Berlin, for example, has interior cities within it and people use these interior cities as part of the address. This is not the case in the United States. Human-centered software must reflect the fact that cities are structured and thought of differently around the world and should provide for fields in address blocks that acknowledge interior cities.

When software takes into account the cognitive context of end-users:

- ~ People are more productive in accomplishing their work (or play) because they are not spending time figuring out how it works or becoming frustrated when they cannot work in an intuitive manner,
- ~ Learning is faster and support costs are lowered because the people do not need as much help in getting started or making system upgrades, and
- ~ People can easily recover from the errors that they inevitably will make.

When people are able to work productively, they accomplish their work with efficiency and accuracy. They can concentrate on the content of the work and not on use of the technology.

Self-training software enables a greater degree of autonomy for all the end-users in the workplace. People do not have to wait for the technical support person, if there is one, to help them. They may be able to figure out for themselves how to accomplish what they need to do with the software or they may be able to come up with a solution in collaboration with a co-worker.

When people are able to recover easily from errors, they no longer blame themselves for making mistakes. They gain confidence in expanding their use of the software and trying out new features that may increase their overall work productivity in many other ways. As a result, they may also gain confidence in their roles within their organization.

Some basic premises of cognitive psychology are now being challenged. For example, most cognitive scientists believe that all people share the same basic tools for perceiving, remembering, and reasoning. But this assumption was not supported in a study comparing the cognitive processes of American and East Asian people (Nisbett, 2003). It is likely that usability engineering will continue to change as the cross-cultural implications of differences at a cognitive level continue to unfold. As the discipline of cognitive science evolves and takes account of these differences, the role of the ethnographers at Microsoft will be very important for better understanding and directing attention to cross-cultural cognitive differences.

The emotional context of end-users

The study of cognition, which was introduced in the early 1970's, does not consider emotional aspects of behavior to be important or even relevant. The study of the emotional brain (*e.g.*, Damasio, 1994; Le Doux, 1996; Picard, 2000) came along several decades behind cognitive psychology and is growing rapidly today. Researchers in this new field have shown that both cognition and emotion are necessary for understanding the human mind and, in fact, that emotion is centrally involved in experiences once thought to be primarily cognitive. For example, the importance of gut feelings (Damasio, 1994) in making decisions has now been demonstrated.

The application of knowledge gained in the study of emotions is just now beginning to play a role in the software development process. This recently emerging field has been referred to by a number of terms including:

- ~ Joy-of-use
- ~ Empathic design
- ~ Emotional design.

Product aesthetics play an important role in emotional product design. Donald Norman, a cognitive scientist with a former disdain for the emotional components of human behavior, has turned his thinking around completely. He now claims that "attractive things work better" and has written a book (Norman, 2003) supporting the claim. The importance of emotional design issues in the software development process is a topic of considerable internal interest today at Microsoft both for the usability engineers and the ethnographers (*e.g.*, Benedek and Miner, 2002).

Ethnographers contribute significantly to meeting the emotional needs of end-users by bringing the emic perspective to the software development team. By observing end-users' behaviors and emotions while using current and/or Beta software, competitors' products and users' non-software solutions at work or at home, ethnographers at Microsoft are helping multidisciplinary team members understand what people value, what they enjoy, and how they do or do not make software products a part of their daily lives.

Ethnographic field studies have revealed that the emotions end-users express while using software are often surprising to the software development team members who have different emotions while using the software.

The team responsible for the out-of-box-experience (OOBE) for Windows XP, for example, learned how seemingly minor components of the interface turned out to be exciting for the everyday end-users. For example, people were very excited when they got to the Welcome Screen and saw that they had their own accounts. Bob Graf, a Usability Lead on Windows, explains, "*Anne discovered how exciting it (user accounts) was. And it really put the "personal" back in "personal computing." And one of the things that now we're trying to do with Longhorn is to really facilitate the personalization.*"

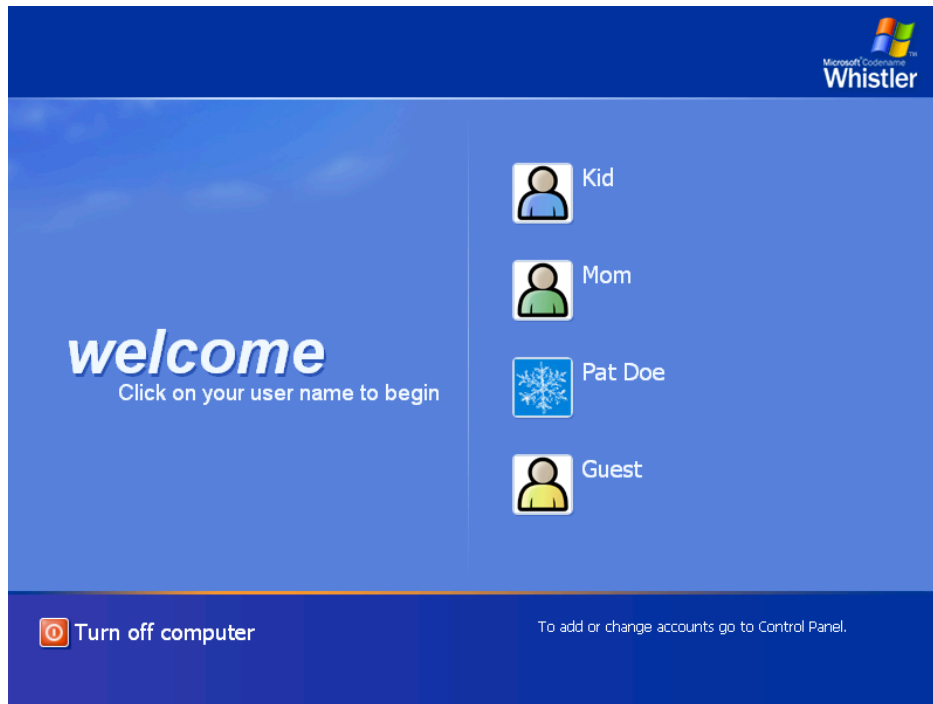


Figure 2: Welcome Screen shot

The emotions revealed in the course of ethnographic research often have a significant impact on the members of the software development team. Direct involvement in ethnographic field studies changes how the team members think about the products they are bringing to life. Nick Leggett, the program manager for Setup and OOBE on Windows XP, is now playing the same role on Longhorn, the next version of Windows. Nick describes his feelings about accompanying the ethnographers on a field study in the following way: "*I think when you feel*

somebody's frustration directly, when you're in the room with them, when you're watching and are a witness to your end party, the husband and wife getting into an argument about Windows, these are the things that make you go, oh yeah, we really need to fix this." Not only did this experience contribute to Nick's general empathetic understanding of the end-users who would be using the final product, but it also enabled him to prioritize his work more effectively so that the end-users' needs would come first.

The RPRD research also revealed that the OOBE took 30 minutes or more, which was much too long from the user's point of view. The ethnographers found that by the time people got to the desktop, they were no longer excited about using their new computers. The importance of initial impressions cannot be underestimated. Initial impressions form a framework against which later perceptions are evaluated. If the first impression is positive, subsequent experiences are assumed to be positive unless an overwhelming amount of contrary evidence changes the impression. Thus, people will be able to tolerate small frustrations far better when they have had a positive first impression of the software through the OOBE. Plans to remedy the long OOBE are underway now for Longhorn.

The ethnographers' work has revealed that the emotional component of design plays a very large role in Brazil. When asked, "Do you think that the user experience is better or will become better in the future, because of ethnography?" Adriana Pedroso Rangel, a Microsoft Program Manager living and working in Brazil, replied "*Certainly! ... Because there's all the emotional relationship with the machine that we cannot touch unless we do this kind of research. And people, at least in Latin America, buy things with a lot of emotional reasons. So if we do not consider that, we are not going to reach a lot of people.*" It is clear from Adriana's response that in order to empower the PC users in Brazil, it is necessary to address not only the cognitive aspects of ease-of-use but the emotional components of the user experience as well.

Today it is understood that the emotional brain has a very large influence on cognitive thought processes that were once thought to be purely rational. In fact, because of the interrelationship between cognition and emotion, positive emotional experiences with software products can lead to more positive perceptions of ease-of-use for those products.

People who have positive emotional experiences with software products end up liking the products and taking pride in owning them. These end-users generally value the products and the experiences they bring. They will put up with minor annoyances and will creatively find ways to use the software to address their needs. These empowered end-users will feel in control of the software (rather than vice versa).

On the other hand, when people feel that the product is in control, their attitude toward the product may suffer, resulting in a fear of making errors, anxiety, and maybe even anger. They may show a reluctance to try new features and develop a negative attitude about work in general. Such emotions make people feel out of control of the situation and can be very detrimental toward productivity.

When software design is based on an understanding of emotions, end-users experience pleasure in using the software. They enjoy work and make good

decisions. They also feel confident, not only in using the product but also in the results of the work they produce using the product. This may lead them to be more proactive in trying out new features and in furthering their learning and mastery of the software, resulting ultimately in greater productivity for their employers.

The socio-cultural context of groups of people

Studies of cognition and emotion are based on the responses of individuals. This perspective facilitates an in-depth understanding of people. Anthropologists and ethnographers, on the other hand, are interested in a broader perspective. They study people as members of social groups such as families, co-workers, communities, etc. They are also interested in the changes that people experience as they move throughout the various life stages over time.

Products that fit the socio-cultural context of end-users benefit from the broad and long view that ethnographers take. Socio-culturally based products:

- ~ Are built upon an understanding of the cultural norms that guide people's behavior, *e.g.*, communication norms;
- ~ Support and enhance the ability of groups of people to work (or play) together;
- ~ Adapt to changing needs people have as they move through the life stages, *e.g.*, child, teen, young adult, adults, elder, etc.

For example, ethnographic research revealed why MSN Messenger was not being used in Japan. Anne Cohen Kiel learned that it had nothing to do with the technology. She learned that the Japanese culture puts a premium on demonstrating respect during communication, and so interruption is just not part of the culture. Unfortunately, Messenger is a very interruptive technology. Furthermore, the Japanese more often use their phones than their PCs, making Messenger not very useful.

An example of software that enhances the ability of groups of people to work and play together is the newly released Threedegrees (as a beta version) that was developed by Microsoft's NetGen division. The Netgen team realized that people who grew up using the Internet, those who are between 13 and 24 today, socialized and shopped differently than previous generations. For example, they met friends online in chat rooms. They tended to socialize instead of communicate. They looked for deals on eBay rather than at the discount stores. The Netgen team spent a long time up front understanding the end-users. The software development process was a blend of ethnographic and participatory research. On the Netgen team were 12 recent college graduates who essentially observed their own behaviors in socializing, communicating, and consuming.

Microsoft's ethnographers are now looking at the needs and dreams of the Baby Boomers and their aging parents as both of these generations change over time. The Boomers are a tech-savvy generation while their parents are usually not tech-savvy. The ethnographers will explore how the generations see each other, what is really important to them, and what role technology should play for each generation in the future.

Ethnography can contribute to the development of products with socio-cultural relevance, thus empowering end-users, by:

- ~ Facilitating natural modes of social interaction,
- ~ Enhancing natural modes of collaboration, and
- ~ Adapting to the changing needs of people as they adjust to various life stages.

When natural modes of social interaction and collaboration are facilitated, people can maintain their cultural identities and natural modes of interacting with one another while still having the opportunity, through technology, to play a competitive role in the global marketplace. The use of one's first language in interacting through technology is an obvious example. The MSN Messenger example points to the less obvious impacts of cultural expectations on communication behavior.

Empowerment of end-users takes different forms as people's needs change across the life stages. The longitudinal perspective shared by ethnographers will play an important role in the development of software that fits into diverse cultures defined by generational differences. This longer-term perspective will help Microsoft be better prepared to develop products for empowering future generations of people.

Changes in the software development process

With the addition of ethnography to the other applied social sciences, Microsoft has completed the multidisciplinary mix needed to inform and inspire the entire software development process. Usability engineers will continue to do evaluative research. Usability engineers and ethnographers will collaborate in the experiential phase. And the ethnographers will become stronger in the generative phase at the fuzzy front end of the cycle as they continue to explore emotional design and socio-cultural implications of the design process. In the generative phase of the development cycle, it may be the case that multiple contextual levels (*i.e.*, cognitive, emotional, and socio-cultural) are addressed in innovation derived from ethnographic research.

Such is the case for multiple identities. The ethnographers have observed that some people have multiple passports, giving them the ability to control multiple on-screen identities. They have observed that for some people, this is done as a matter of privacy. This discovery has opened up the opportunity for new identity management features in the software.

Ethnography's emic perspective is helping the multidisciplinary teams to build a deep and empathic understanding of their end-users. Terri Duffy, a User Assistance Manager, expresses what she has learned through her interaction with Windows ethnographers Tracey Lovejoy and Nelle Steele concerning international issues, "*... in all of these countries they've been in there are these families in the household, and we've seen pictures. We know who these people are. We know their names. We've seen their kids. These families will do anything it takes to get a computer because they see it as a way out for their children. And they will have probably one computer.*"

There is a lot of internal sharing about ethnography going on at Microsoft. This is particularly evident when one or more of the ethnographers goes to another country

to study the culture there. The forms of sharing range from fun and less formal means such as blogs, posters, photo stories, Websites, a party, etc., to more formal means such as internal presentations and white papers. The ethnographers see the internal sharing as a form of evangelism and carefully consider how best to stage it. Their enthusiasm has infected other project team members and there is also a lot of positive energy being spread by people with whom they have collaborated. The evangelization of ethnography that goes on inside Microsoft contributes significantly to its success.

Many people at Microsoft are involved in addressing the needs of the global marketplace. But because of their face-to-face contact and continued communication with the global representatives, the ethnographers play a special role. For example, Adriana Pedroso Rangel, sees the ethnographers as "ambassadors" at Microsoft headquarters for her own country, Brazil.

Kent Sullivan, a Usability Lead for Windows, describes his point of view on the contribution of ethnographic research: *"The United States is terrible in terms of ethnocentrism. I mean, it's rampant here. And so I can't imagine how else we could have raised awareness about cultures around the world, and especially emerging markets, better than doing ethnographic work. I mean, you can read focus group reports until you're blue in the face, but you don't really get it until you see a video or a picture of somebody living in a one-room hut with a straw roof. That's a lot of the value. It's just the shock treatment. Getting people aware of how people really live and work around the world."*

For example, when the ethnographers came back from India they brought back a picture of an office filled with power backups, like UPSes. They asked the Longhorn development team members, "How would you design your product differently if the power went off four times a day?" The development team, whose power goes off about once every six months, was amazed.

There was a consensus among those interviewed that the impact of ethnography at Microsoft will continue to grow. A number of the people interviewed volunteered that it would benefit Microsoft to have more ethnographers on staff. With over 50 percent of Microsoft's income coming from international markets, it becomes even more important to understand the needs of various cultural groups.

How ethnographers are changing the culture at Microsoft

Ethnographic research at Microsoft has been built from a bottom-up approach together with a lot of enthusiasm and energy. Anne Cohen Kiel is proud of the fact that her (and the other ethnographers') work has had an impact on the products that Microsoft produces. But she is even more proud of her role in helping to change the culture at Microsoft from a developer-driven to a human-centered organization. As Anne explains, *"It's not building for technology's sake anymore. It's actually building because the users want it or need it and are asking for it."*

Conclusion

Ethnographic research plays a critical role in the software development process at Microsoft. Ethnography brings the emic perspective, the point of view of the end-users, to the multidisciplinary teams. The combination of ethnography and usability engineering delivers results in products that provide ease of use, enhance joy of use, and fit the socio-cultural context of everyday people at work or at home, leading to the empowerment of end-users on cognitive, emotional, and socio-cultural levels. Ethnography is already a major contributor to the changes taking place in the transformation of Microsoft from a technology-driven to a human-driven company. The potential impact that ethnography will have in the identification and development of new product opportunities for the future has yet to be seen.

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