Humans Are The New Users: An Examination Of Word Use In CHI Literature

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Abstract

In this paper we describe, through a philological and philosophical investigation, what we think the effects of the word "user" are on HCI research. By recognizing that the HCI community employs the word user in a predominantly passive role we will attempt to show that a shift in terminology, replacing "user" with "human" or "person", will positively affect not just our use of jargon, but our fundamental concerns with design. Through a study of the word itself, including its historical usage in the English language, and then its usage in the corpus of CHI scholarship, we will show that a consideration of these factors could drastically change how we envision and interpret the work of our own community and positively affect the design process.

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Introduction

"Treat people as if they were what they ought to be, and help them to become what they are capable of being."

- Johann Wolfgang von Goethe (1749-1832)

People use the word "user" a lot in CHI papers. This is a hybrid essay that argues that the words we use to describe our work can have a negative effect on the design process. Before we can make this claim outright, we first need to look into how and why the words that we use have the power to affect the people. This paper raises the specific question: What are the implications of using the word "user" in CHI literature? And, why

should we care? This essay is about the word "user," and how it negatively affects our work.

In this paper we look at how the HCI community has historically employed the word "user" in its literature and how the use of this word can lead to a negative understanding of human interaction and thus negative implications within the HCI design process. We suggest that by changing terminology the community can help to restructure the way those for whom interfaces are designed are thought about, and can affect positive change in the attitude towards people for whom technology is designed.

From the perspective of an HCI researcher, there is precedent for this type of change in the existing literature. The history of HCI is replete with the view of "users" as active and the relationship of the human and the computer as symbiotic. From a historical perspective, we are currently using terminology from a previous epoch of design: the growth of our discipline is evolutionary and the current terminology of the word "user" actually applies to a paradigm that we, as a community, have moved past. From a linguistic perspective, words are symbols that serve as currency for action and interpretation: historically, words shape societies and, in turn, are shaped by the society in which they have been used and developed. Awareness of this fact is vital to an understanding of our design process. From a pragmatic perspective, there is considerable precedent for this type of terminological change as witnessed in the HCI communities' adoption of the results of the subject/participant debate in psychology. There is a direct link between the uses of the word "user" in HCI and the "subject/participant" debate in psychology; the word "user" objectifies people in the same way that calling them "subjects" does. And, just as Psychologists argued that this has a negative effect on their studies, we posit that this objectifying terminology also has a negative effect on design.

The Historical Perspective

In this section we consider the history of HCI as evolutionary and argue that our terminology has remained static while the development of technology has developed dynamically.

Historical evolution of the human in the HCI relationship

From a technological perspective, we characterize the growth of the field of HCI as being evolutionary. As a community we seem to understand this in terms of technology, but not in terms of language. The main problem is that while the HCI community has been intimately involved in the advancement of technology, we have continued using terminology from a previous epoch of development. In HCI research one of the ways this has been affected is in the switch from a focus on individual "users" to an understanding of groups [38], and, most recently to an increase in work dedicated to natural interaction [35],[36]. We have simply moved passed "users" as a design paradigm.

In charting the historical trends in HCI, Grudin[39] points out that many researchers adopting a visionary stance on HCI have characterized a perspective requiring the "user" to be treated actively within the design process. For example, in an influential paper outlining the relationship of the human and computer, Licklider[40] uses the term "symbiosis," a word that stresses the mutual relationship between the two

entities. Similarly, Kling [41] emphasized the need for accommodating a person centered computing technology, and Bannon[42], argued for "human actors" in an article entitled "From Human Factors to Human Actors". In a recent article, Bannon[43] follows up on the concept of human actors and expresses that in the development of the discipline it may be possible to finally make the move towards an implementation of the notion of humans as actors; we are poised to treat humans as active participants in design and interaction.

Historically, there has been a tension in the HCI community between the rapid shifting of technology and the undercurrent for characterizing the need for human centered design. One of the ways to bridge this gap is to recognize that to be able to reconcile this change with the call for human-centered design we must, as a community, update our language alongside this technological change.

Ontological significance of the human in the HCI relationship

There is a conflict between the goals of design and the terminology used to describe those goals in HCI. To describe the parameters of this relationship it must first be understood how this relationship is constructed; this construction is one of the main points of theoretical conflict in the current design process, namely, that we design interactive systems for active participants but use terminology designed for passive "users".

In other examples of this type of inversion of passivity, Vannevar Bush described MEMEX as a memory extended for the human and not vice versa [44]. Similarly, in Activity Theory, researchers portray the human as an active entity participating in a system that cannot function through passivity. Our current terminology, at best, recognizes that both participant and tool are passive. The design process should treat the human as active and the first step in this process is recognizing that our terminology leads to passive treatments of the people we are designing for.

The Linguistic Argument

In this section we consider the argument from the perspective of: the power of words and the philology of the word 'user'.

The Power of Words

The literary critic Northrop Frye [1] wrote in his book *Words with Power* "when we read (or otherwise examine) a verbal structure, our attention is going in two directions at once. One direction is centripetal, trying to make sense of the words we are reading: the other is centrifugal, gathering up from memory the conventional meanings of the words used in the world of language outside the work being read." [1]. In our community the terminology that we use has the power to define how we understand our own subjects of investigation. The dynamic nature of language means that we have the power to enact semantic changes simply by changing how we use words.

For example of current usage, the following is a sentence chosen from a CHI paper that when compared with all of the papers ever published at CHI was in the 95th percentile in terms of the occurrence of the word "user" (the full investigation of CHI publications appears later in this paper):

"The importance of an early and on-going focus on people in interactive system design is widely accepted.

27 B.C	Def. 1.a	General use of things
1935	Def. 1.b	Drug use
1965	Def. 1.c	Computer use

Table 1. Approximate dates for meaning change for the word "User".

*However, in practice, involving **users** poses many problems and requires designers to balance conflicting demands."[2]*

We are calling in this paper for a reconsideration of how we use the word "user" in our research. If we simply replace the word "user" with the word "human" or "person", the degrading effect of the original is immediately clear:

*"The importance of an early and on-going focus on people in interactive system design is widely accepted. However, in practice, involving **humans** poses many problems and requires designers to balance conflicting demands."*

The distinction between these two sentences is subtle but significant. In sentence one, the user is a passive entity, waiting to be acted upon. But, in sentence two, although still passive, the addition of the word "human" adds a level of complexity to our participants that encompass all of the things that make us human. We think that, with a clearer understanding of all of the factors that go into giving the words we use power, it will become evident that a change in lexicon is in order.

The general ethos of human-computer interaction (HCI) is to place the human at the centre of the design thinking (this is directly acknowledged by the fact that we have chosen HCI as our banner) and we acknowledged the importance of words by calling it "human-computer interaction" rather than "user-computer interaction"; the idea of thinking about humans is already a central tenet of our work. The main problem we face is that we use "user" all the time (we even call it user-centered design (UCD) and do user studies, etc.) but by investigating exactly how the terminology that we employ actually contradicts the design imperatives of our discipline we can make a case for a shift in the words we use.

Philology of the word "user"

This section outlines the history of the word "user" and how its meaning has changed over time. This is important because it helps to correlate time periods when the word came into greater use and when it appropriated its negative connotations.

The word "user" can be traced back to the Latin *ūsus* which is defined as the act of using a thing, its application, employment, and equivalent. It was adapted as the agent noun from *ūsus* describing the one who performs the action of use. It is the past participle of *ūtī* to use + *-tus* suffix of verbs of action. It then passes through Old French as the word *user* and between 1175 and 1225 passes into Middle English in the form *Usen,* which is where we inherit the form we now know. The current definitions of the word "user" in English are as follows (OED):

1.a One who has or makes use of a thing; one who uses or employs anything..

1.b A person who takes narcotic, etc., drugs. origin U.S.

1.c A person or organization that makes use of a computer.

Language in general and the meanings of words specifically are quite dynamic. Over time, many factors including but not limited to cultural shifts, politics,

technological trends and editorial practices shift and change languages constantly. What is interesting about the word "user" is that its meaning was quite static from the time of the Roman Empire until the turn of the twentieth century. The word's usage spiked during the second industrial revolution where manuals for new machines included the word "user" and then changed drastically in around 1935 when the words "drug user" started to be used. We can only speculate why the meaning of the word shifted, but by performing an analysis of Google's *n*-gram from the English language we can begin to assemble evidence for this change. What is important to realize here is that all three definitions of the word user are part of what makes up the word and gives it its "power." Even if we don't intend to use the word in certain ways, the negative connotations of the word are still wrapped up in its history and therefore in its use. Moving forward we need to be aware that the terminology we use has the potential to not only be misinterpreted due to its multiple meanings, but also to affect how we operate within our own community. The difficult part of this idea is that conscious awareness of this process is not a necessary condition for having it occur. Words, themselves, have power. What follows is an analysis of how we employ these words (and everything that comes with them) in CHI literature.

The Pragmatic Argument

As a community we need to recognize that our words have power. One way to do this is to understand the history of the terminology we use. In this section we perform an n-gram analysis on several different words: user(s), human(s) and person(s)/people, to help understand how the use of the words changed over time.

N-gram Uses of Words

To get a basic sense in the English language of the cultural history of the words in question, we present two graphs taken from the *n*-grams dataset. In Figure 2, we have plotted the words "human" and "user" to show how the words are used over time (we have combined the counts of both singular and plural uses, as well as instances that begin with a capital letter). We can see clearly that, up until the turn of the twentieth century, the word "human" is very active in the language, where the word "user" is quite stable (and more rarely used); this sudden shift is likely due to an influx of manuals for steam powered machinery. Then, its use escalates until the 1960's when it begins to climb aggressively.

The first argument we would like to make is that the sudden and dramatic increase of the use of the word "user" since the computer revolution in the 1960's has brought with it the negative connotations that the word picked up only 30 years prior and that the power of the word "user" inherently holds this negative spin within it. The concern is that the semantic meaning of the word is thus greater than what it is used for in literature and specifically CHI publications and that our designs are influenced by the history that is held within the words.

The second is that in CHI publications there is a noticeable trend of the word "user" being employed as the object of action as opposed to the subject of a sentence (like "human" and "person" tend to be). This treatment of the "user" as object in our sentences has a direct correlation to this type of treatment of "users" as design objects. Through an investigation of the

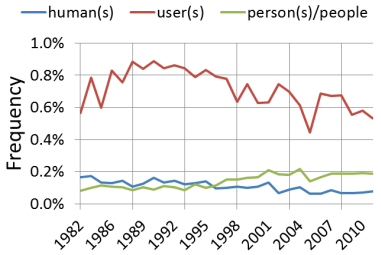

Figure 1. Frequency of word usage for the words "human", "user", and "person" from the dataset of all CHI papers published from 1982-2011.

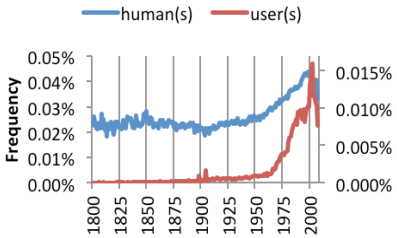

Figure 2. Frequency of word usage for the words "human" and "user" from the Google Books *n*-grams dataset from 1800 to 2008, plotted along different vertical axes to highlight change over time.

actual CHI literature, what follows is an illustration of this hypothesis.

The Term "User" In Chi Papers

In order to be able to analyze the use of terms in HCI research, we parsed the 30 years of CHI publications (1982-2011). To accomplish this, we downloaded the PDF versions for each year and counted instances of each word using the optical character recognition (OCR) already provided in these documents for years 1982-2000 and the digital text provided in the documents for years 2001-2011. We present graphs of the usage data, calculated using the same technique as described by Michel et al. [35] for Google Books data (the number of instances of the *n*-gram in a given year divided by the total number of words in all publications for that year). Note that we only calculated 1-grams for this dataset and our word counts were case-*in*sensitive. Since we were primarily interested in instances of the words without punctuation, we removed all punctuation in our word counts. For example, "human-computer" would become "humancomputer" and not tallied in the count for instances of the word "human".

Our analysis shows that there appears to be a correlation in regards to the 1998 call from psychological sources to change their terminology and that the crossover of the upward trend of the word "participant" and the downward trend of the "subject" shows that the HCI community is already well versed in changes of this type. Our goal is to see the already downward trending use of the word "user", which we are claiming objectifies the participants of our design projects, cross over with the word human, a word we already use to identify ourselves as a community.

The Psychology Model

There is precedent for this type of rationale that can be found in the conflict between the word "subject" and the word "participant" in psychological research. In 1995 The British Psychological Society "[a]fter noting that psychologists owe a debt to those who agree to take part in their studies, who therefore deserve to be treated with the highest standards of consideration and respect, the society recommended that the term "subject" should be abandoned and replaced by "participant"" [7]. In 1998 P.M. Boyton[8] published an article in the British Medical Journal entitled "People should participate in, not be subjects of, research" in which he called for terminological reform in psychological research studies which would shift from the generally accepted word "subject" to that of "participant". This action was spawned by a belief that the words that psychologists used held power and had an influence over how they were conducting their research studies. This debate in psychological circles has a direct correlation to our design processes in HCI. Figure 3 is an n-gram analysis of the use of the words "subject" and "participant" in CHI literature published since the first SIGCHI conference in 1982. It is clear that in or around 1998 the use of the word "subject" was replaced by the word "participant". We see the imperative for these two words being very much the same as the words "user" and "human".

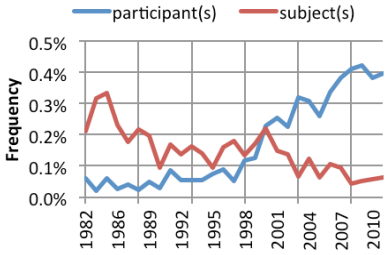

Figure 3. Frequency of word usage for the words "participant" and "subject" from the dataset of all CHI papers published from 1982 - 2011.

What the psychologists realized was that by labeling their "participants" as "subjects" that the pragmatics of the word "subjects" was negatively impacting their work. There passive treatment of "subjects" was influencing how they ran their studies and thus what types of information and insights they were gathering and having. In terms of HCI this is the same process that we suggest is happening with the word "user", that as a community we do not fully understand all of the implications of its use and are being affected by it in our research. What we suggest is that there are other words in our lexicon that act in the same ways as the word "subject" and that they also need to be considered while creating new designs, conducting our studies, and publishing our papers.

Examples of use In CHI papers over time

In this section we employ the same type of investigation from the previous section but apply it to all published CHI papers to try and connect our thinking about the language at large to the specific forum of HCI research.

To demonstrate the contrast between how the CHI community uses these different words, we have taken sample sentences from papers with the highest word counts over the thirty years of CHI publications. The results are shown in Table 2. We have also randomly selected sentences from papers from each decade to show how our use of these words has not evolved much in the past 30 years. This excerpt is taken from a 1982 CHI paper and employs the word "user" in a very specific manner:

"One could argue that we are only producing a first draft, after all, and that the user could be expected to add connecting elements and punctuation while improving the substantive content of the draft" [10].

Another sample chosen at random from 1992:

"Similar graphics would be applicable to a variety of human-computer interactions where visual feedback is possible and may well lead to a more user-friendly system" [11].

and from 2002:

"Individual visitors obtain information about objects in their environment using a visual interface. This helps visitors maintain the flow of their visual task (looking at the room and its contents), which tends to reduce demands on user attention"[12].

In 2011:

"Designing technology as socially desirable should be explored in introducing new technologies, particularly for technologies that involve learning or require acceptance for reluctant users" [13].

What can be seen by the broad stroke investigation is that across decades the context of the word "user" has stayed relatively static. The tone and use of the word in four randomly chosen samples all seem to be quite consistent suggesting that even though technology has rapidly changed, our terminology has not.

Possible Recommendations

We are refraining from making design suggestions on the basis that our experience with this terminological

Years	"user(s)"	"human(s)"	"person(s)" or "people"
1982-1986	"The user model in UC encodes the user's knowledge state and allows UC to tail its responses to the user."[18]	"When a human and computer perform similar tasks in parallel, it is important that an effective line of communication exist between the two entities."[19]	"The use of computers in the workplace has increased our opportunity to open new avenues of employment for handicapped people."[20]
1987-1991	"User modeling is important to many systems that attempt to adapt their behavior to users in order to interact more intelligently."[21]	"The goal of human factors research in an industrial setting is to guide quality product design."[22]	"KMS is designed to support not only people's individual work, but also their collaborative work."[23]
1992-1996	"When users are unduly influenced by the frame provided by the implementer, users' constructed understandings may be less reflective of their experiences with the new technology."[24]	"The paper proposes that some current problems in recruiting human factors methods to system design might be alleviated by means of a structured human factors design framework."[25]	"People meet for a variety of reasons: to discuss and share ideas, to argue and make decisions, to plan, and to socialize."[26]
1997-2001	"The importance of an early and on-going focus on users in interactive system design is widely accepted. However, in practice, involving users poses many problems and requires designers to balance conflicting demands."[2]	"Promoting the exchange and dissemination of human factors information, as well as educating co-workers about human factors has been a key goal for many in the human factors community."[27]	"While current awareness systems are useful, they support only a handful of the attributes that comprises awareness information and how people in the every day world use it."[28]
2002-2006	"We introduce Stencils, an interaction technique for presenting tutorials that uses translucent colored stencils containing holes that direct the user's attention to the correct interface component and prevent the user from interacting with other components."[29]	"HIPs, or Human Interactive Proofs, are challenges meant to be easily solved by humans, while remaining too hard to be economically solved by computers."[30]	"Those interactions are often the mechanism by which people learn relevant news and get updates on current activities, and by which people develop personal relationships with their colleagues, which in turn motivate them in their work."[31]
2007-2011	"In this paper we propose hidden markets, a new design paradigm that attempts to mask as much of the prices, account balances, trading constraints, etc. from the user as possible."[32]	"Turing's article stands as enduring evidence that the roles of human computation and machine computation have been intertwined since the earliest days"[33]	"This paper explores how homeless young people, aged 13-25, make use of information systems in daily life."[34]

Table 2. Samples of sentences from CHI papers with the highest counts of each word over the last 30 years.

change is anecdotal. But, what we are saying is that the terminology that we use, and how we write about our work has a strong effect on how and what we design. For example, the authors of this paper have started implementing this change in terminology in our work and we think it has had a positive impact but has yet to be tested empirically. The recommendations that follow are what we have implemented in our research, writing, and teaching practices and would encourage others to adopt the same protocols.

Our recommendations are as follows:

1. Go through your papers before submitting them for publication and remove the word "user", substituting in words and clauses that do not demean the people we are designing for.

2. Don't "replace all" [in a word processor] because of the subject object problem we have talked about. We are suggesting that we need to take the time to rethink how we express ourselves in terms of our own research and that this action will in fact have positive consequences.

3. To understand how these actions can have a positive impact on design and as a community buy into the fact that the way we describe our work is important and has consequences.

Conclusion

In this paper we have outlined our view that the use of the word "user" is out of synch with the current state of HCI design. The evolutionary nature of technological innovation suggests that terminology itself must also change, but in light of that fact the power of such a word to convey negative viewpoints is ever present.

When we mix these views with a careful investigation of CHI literature it becomes apparent that the use of the word "user" is usually accompanied by a passive view of that person's involvement in the interface design and use. This potential for overlooking our human participants is a very real danger that can be influenced by our terminology.

In this way, we feel that the small step of changing how we talk about our "users," and recognizing that they are, in fact, people, is a excellent starting point for influencing change within the design process.

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