
Aging, HCI, & Personal Perceptions of Time

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CHI'17 Extended Abstracts, May 06-11, 2017, Denver, CO, USA
ACM 978-1-4503-4656-6/17/05.
<http://dx.doi.org/10.1145/3027063.3053079>

Abstract

While aging has become an influential area of research in HCI, the science of human longevity presents itself as an untapped framework through which HCI researchers may further investigate. The present work presents preliminary research on older adults' personal perception of time in context with their personal perception of technology. Researchers worked to thus investigate the underlying socioemotional effects of technology during the aging process. Initial results suggest research opportunities in regards to HCI's awareness of and potential influence upon personal perception of 'time'. Beginning with a sample of older adults previously interested in technical innovation, we point to (1) the processes behind intention to learn about novel technologies and (2) personal perception of 'time' or longevity coinciding with said investment. We pose questions and aim to inspire discussion and future investigations into time as a foundation for self-reflection and perception.

Author Keywords

Time; Perception; Aging; Temporal Experience; Reflective Practice; Socioemotional; Perception

ACM Classification Keywords

HCI): Miscellaneous

Socioemotional Selectivity Theory (SST)

According to SST, “time is fundamental to human motivation” and acts as framework by which we approach novel and or emotional information throughout our lives [2, p. 166].

On one hand, when time is perceived as open-ended - such as in our younger years - new experiences, new social connections, and knowledge acquisition are all felt as both natural and important to seek out. In contrast, as one ages and time begins to be perceived as diminishing, positive socio-emotional experiences become one’s primary focus.

Older adults thus tend to regulate and *narrow* their scope of experiences and interactions to ones that are most positive, poignant, and beneficial for their perceived ‘shorter’ time left on earth.

Depending on each individual, *such narrowing may include or exclude perception and use of today’s novel technologies.*

Introduction

The understanding of time and its relation to HCI aging research has been a hot topic in recent years (see overview: 11, 12). Moreover, an emphasis on the larger process of aging, in relation to older adults as a population of users and adopters, has formed a solid body of meaningful work in the HCI community [4, 19]. While older adults may represent the fastest growing yet vulnerably perceived [13, 18, 19] population today, they also represent a set of users simultaneously defined by the joys of accumulated experience and the valued remaining time left in life [8, 18].

Embracing an understanding of aging that embodies the multifaceted realities, lived experience, and *benefits* of longevity [9], more recent HCI work has shown that technology can be used to support this comprehensive, well-rounded, even “eudemonic”, perspective of aging [10, 16, 17]. This new wave of investigatory practices and design-oriented aging work [eg. 6, 15] develops an interesting stream of research and artifacts that tap into the *potentials of aging*, rather than its vulnerabilities [18]. This expansion in HCI aging research motivated us to take a more theoretical and qualitative stance on aging. Specifically, researchers began by looking into novel facilitators or catalysts for improved older adult quality of life (QoL) [3]. Furthermore, a broader objective of insight into older adult long-term investment into technology was also considered [5].

In this paper we introduce initial analysis from a qualitative study of older adults at a local computer club. Working with individuals already investing time into learning about technology provided insight into specific motivations for technology use, as well as

perceptions of self in regards to current technology development. Through analysis of the data, we began to identify a relatively technology-independent theme: the collective perception of *time* as a unique and pervasive motivator, through which individuals frame their engagement with technical innovation. This initial analysis also presented several deeper aspects of perception of time, specifically its relation to one’s life course, sense of self, and aspirations for future action or engagement.

To further explore this emergent theme of time, and to gain a broader gerontological perspective, we drew on Carstensen’s Socioemotional Selectivity Theory (SST) [2]. With this SST lens of time as ‘accumulated life experience’, an individual’s combined perception of self, time, and personal journey through longevity can be utilized as a working definition of aging in future HCI research. *Our present work thus contributes to a focus on the lived experience of aging through time, lending itself to both aging and HCI debates, as well as current discussions concerning the use of time in HCI.* As we ultimately present our data through the lens of SST, it is introduced here in the sidebar prior to the description of the study.

Methods

The present work arose from qualitative interviews and interactions with members of an older adult, Viennese computer club (for example, see Fig. 1). Our aim was to investigate a self-selecting sample already investing time into learning about novel technologies and to understand underlying factors, if any, of long-term technical investment.

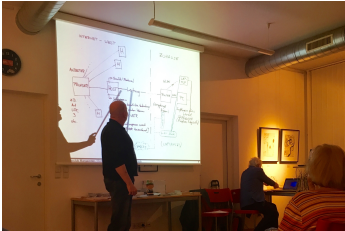


Figure 1: A Club coordinator introducing the 'Internet of Things'



Figure 2: Group members learning about Give and Take

The Context: The Computer Club has been operating for 25 years and many of the current members have been active (meeting twice a month, two hours each time) for upwards of 5 to 10 years. The first author took part in four consecutive meetings, aiming to build rapport and acceptance from the members and collect data. Over time, she was able to transition from observation to participatory interaction, holding conversations with various members throughout.

Data Collection: Data takes three forms: interviews, field notes, and observations. There were three semi-structured, transcribed interviews conducted, ranging from 45 to 90 minutes. As stated on the signed consent forms, pseudonyms were used to protect anonymity. Field notes were collected from conversations with members and coordinators, and from meeting observations. Topics and questions for conversations included, but were not limited to, self-reports of daily use or interaction with technology, perception of technology in their home or work places, and motivation to engage with novel experiences. During and after conversations with members, quotations and the context in which they came were written down. Lastly, detailed observations were taken of the four club meetings.

Participants were contacted through a club presentation for a new collaborative sharing platform called Give & Take (see Fig. 2). Of the over 100 club members invited, 8 members and 3 coordinators came to the presentation event, providing us with a core convenience sample of individuals investing time into learning about novel technologies. The initial methodology and approach was open-ended, referencing Braun and Clarke's thematic analysis [1].

Analysis and Results

Time: A Foundation for Validation

During analysis, time and longevity arose independently as defining factors. Perception of one's self upon a longitudinal or aging 'time-line' tended to influence *self-definition* and or *validation* of an individuals' current and future technology context. Our present analysis of time and longevity, in terms of technology, falls within two core themes: (1) Present Tense Hard Work and (2) Future Investment and Perception. Within each of these core themes, we break down specific instances that uniquely connect longevity (SST), technology, and time for the older adults.

Present Tense Hard Work

When participants began to discuss the hard work that was required of them to learn about new technologies, time and a sense of longevity presented itself as a primary motivational factor. Specifically, hard work was often discussed in terms of one's '*generational age*' (a perception of self in regards to when one was born) and '*personalized time-line*' (the longitudinal experience of aging) in comparison to others. Below are some primary examples from participants.

Generational Reference Points

Emma, a woman in her late 60's, specifically references her place in the 'older' generation when making the effort to learn more about modern technology. She often finds herself "*tak[ing] long days to read the rules and requirements...*" for the technologies she currently owns (e.g. Cell phone, Tablet). Moreover, she mentions that although "*many older people let the younger people do this [hard work]... [she] doesn't want young people thinking [she] can't do anything, that they can't do anything more with [her]....*"

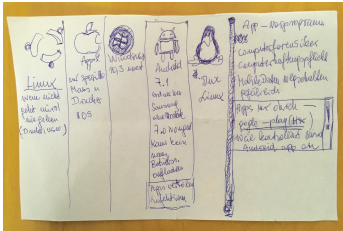


Figure 3: Notes regarding different 'Operating Systems'

Emma's reasoning to invest such time is based directly on her perception of age and generational differences, an example of a learned, temporal factor determining past, present, and future time perception [21]. Stefan, a club coordinator in his mid 60's, similarly considers his present technological self through the lens of generational differences. His distaste for present day, age-based, technology differences motivated him to join the club and work hard to become a coordinator (i.e. dedicate time and effort to be knowledgeable enough to organize presentations and communicate challenging information). This hard work came after realizing that older adults, such as himself, were part of *"the last generation that needs to do [the hard work]...I want to understand... because I need to get with the current times."*

Time-Line Progression

Another aspect of present tense hard work came from current member, Elisabeth (age unknown). Elisabeth presented her motivation to invest time into learning about modern technology within the direct context of her own aging process and time-line. Interestingly, Elisabeth is not regular member but, instead, chooses her meetings based on subject matter. Specifically, she likes to attend meetings when the *subject is something she doesn't understand but is interested in learning more about*. This aspect of choice comes from an interest in learning about the unknown in the field of technology.

Furthermore, Elisabeth takes notes at each meeting to then bring home for future reference. For example, her notes (Fig. 3) are from a session detailing and comparing different computer operating systems. Referencing the notes' subject matter, when asked if

she was looking to buy a new computer, Elisabeth responded: *"Oh no, I am just taking notes... its good to know these things as I get older. I like to try understand these hard, new subjects."*

The impetus to work and try to *'understand hard, new subjects'* may be initially categorized under a motivation to simply *learn* said new subjects. However, when such hard work is directly referenced through the lens of one's longevity or time-line, i.e. *'getting older'*, hard work allows (1) access to the present field of technology, and perhaps (2) a re-conceptualized sense of self as technologically *knowledgeable* and up to date in this field.

In reference to Carstensen's SST [2], these preliminary, thematic data may suggest that investment into technology, and the subsequent hard work, illustrates distinctive, unique steps towards *defining* and *grounding* the aging 'older' self in the present technological climate. This is suggested by the participants' investment into learning about new subjects that allow them to *maintain* a place within and increase their awareness of the current technological field – keeping up to date. Uniquely, these results both support SST, as these older adults reference their age and thus longevity time-line when making the present choice to learn, as well as supplements SST with the perspective of technology as a possible moderator in the process and perception of aging.

Moreover, the present findings also relate to current HCI discussions regarding multiple temporalities of time perception [11] and how technology innovation itself may be *'speeding up'* and or altering our general perception of time [12, 14]. Subsequent research may

work to understand how perceived temporality, within technology learning processes, may not only *ground* and *define* an individual, but also *enhance* how they approach future aging practices.

Future Investment and Perception

The second core theme is based on the perception of the future self and one's subsequent investment into technology. In lieu of this thematic discovery, we aimed to understand if investment in technology was also relevant to one's perception of 'future' aging practices. While time was previously mentioned as an integral reference point for present tense technology interest and hard work, time's effect on *future socioemotional QoL* and *long-term technical investment* was also found to be noteworthy. Examples of interviews and conversations below highlight this finding.

Future QoL

The first aspect of an altered perception of 'future' time and personal longevity was identified in an interview with Edgar, a member in his early 70's. Edgar defined himself as an 'investigator' and focused primarily on his affinity for curiosity. More specifically, he spoke at length about always trying to "*unravel the mechanisms and [to] not simply be presented the answer or solution,*" claiming that "*knowing, [and] asking why... is protection for your future*" self.

When asked to provide an example of a technology, if applicable, that allows him to pursue this investment in one's 'future' self, he mentioned Google as a search engine. Although a seemingly basic and ubiquitous technology, he explained that he "could not live without Google", because it is a new, "gigantic reference book" for his questions. Unlike before when he went out of his

way to discover an answer, he now simply goes to Google and references forums with hundreds of people and perspectives. Edgar loves how Google has already improved his daily intellectual QoL, but his investment into Google as a technology may also represent a technologically-based investment in his own future. In this sense, *Google is a unique technology that will allow him to continue to be curious for years to come*, as it allows him to "*unravel the mechanisms*" (Edgar) on his own time and in his own way.

Taking the Long-Term Perspective

While Edgar referenced Google as a present and future technology benefitting his QoL, Amy, a member in her mid 60's, took a step back and referenced technology's long-term development while simultaneously considering her past, present, and future self. Although wary about consistent technology use in her daily life, she was excited to have seen technology develop throughout her life. While explaining what technologies she currently uses, she began to recall the process that brought her to this current state. She reflected that it all began when she was "*10 - a teacher explained that there was a new thing called a TV... I didn't believe it then, but now, 50 years later we have cellphones... I can listen to my new WiFi radio whenever [I want]... and I can connect to [radio] stations from my hometown. I love that I can experience my hometown, my past, in the present! I've lived through all of that!... I cannot think of not having [these technologies]... I cannot and will not think the same way anymore.*"

Unlike many aging processes such as cognitive or physical decline, technology was something that grew and progressed with Amy's time-line. She may be excited about technology's current developments, but

by experiencing the long-term growth of technology, she now invests time and interest into what will come next; she now invests in her future self in a different way by means of her past experiences investing in and learning from technology.

In reference to Carstensen's SST [2], Amy's personal time-line and longevity may have not only been molded by technology's long-term presence in her life, but perhaps was also enhanced by her new found capacity to embrace future innovations in a constructive and positive way. Furthermore, this altered perception further exemplifies how an ability to embrace multiple temporalities [11] can directly influence an individual's life-course and, more importantly, sense of longevity and QoL. Such findings may supplement Carstensen's SST [2], as it adds the nuanced layer of technology experience to one's, often socioemotionally reformed, perception of future self and longevity. Subsequent HCI research may thus work to understand how technology can be designed in light of an individual's already technologically enhanced time-line.

Final Thoughts

As recognized through these preliminary discoveries, an older adult's ability to reframe and validate one's aging self *through* the presence and use of technology presents a unique perspective for HCI work on *time*. Specifically, adjacent to a top-down approach of how technologies may presently design or alter felt time (7, 11, 14), HCI research can also investigate the bottom-up process of how time is naturally experienced, working to understand technology's potential through this lens. Meeting in the middle, time, as a natural human experience [2, 21] thus becomes an accessible

and integral variable when designing and assessing present and future technologies.

Future Questions

In light of the findings in this late breaking work, we pose three future research questions to the larger HCI field.

1. What more can we learn from a population who may perceive time as diminishing rather than 'expansive' [2], to ultimately extend HCI's awareness and use of time as an innovative resource?
2. How can HCI researchers utilize technology-based perceptions of time to improve QoL and or technology investment for older adults?
3. How can the HCI community utilize older adults' temporal sense of longevity to foster positive self-perception throughout the aging process of younger generations?

Acknowledgements

We would like to thank The Computer Club coordinators and individuals that participated in our research. This research is also partly funded under the EC funded Give and Take project (Grant #FFG 841963).

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