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Transitions in Digital Personhood: Online Activity in Early Retirement

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ABSTRACT

We present findings from a qualitative study about how Internet use supports self-functioning following the life transition of retirement from work. This study recruited six recent retirees and included the deployment of OnLines, a design research artifact that logged and visualized key online services used by participants at home over four-weeks. The deployment was supported by pre- and post-deployment interviews. OnLines prompted participants' reflection on their patterns of Internet use. Position Exchange Theory was used to understand retirees' sense making from a lifespan perspective, informing the design of supportive online services. This paper delivers a three-fold contribution to the field of human-computer interaction, advancing a lifespan-oriented approach by conceptualizing the self as a dialogical phenomenon that develops over time, advancing the ageing discourse by reporting on retirees' complex identities in the context of their life histories, and advancing discourse on research through design by developing OnLines to foster participant-researcher reflection informed by Self Psychology.

Author Keywords

Retirement; lifespan-oriented research; personhood; ageing; research through design; position exchange theory.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

The Human Computer Interaction (HCI) community has seen growing interest in *lifespan-oriented perspectives* on 'digital living' and technology design [37]. Alongside a multi-generational perspective that considers the long-term

sustainability of technology [18], it is argued there is great potential in studying key transition periods in a lifespan to critically consider our changing digital behaviors and values held in Internet-enabled technologies [2]. Therefore, HCI research has recently considered key events in technology users' lives, such as 'coming of age' [45,61], marriage [36], becoming a parent [22], relationship break-ups [57], divorce [40], and death and memorialization [37].

Retiring from work is understood to be one of the most significant transitional periods a person will encounter [28], one in which daily routines and experiences fundamentally change, affecting subjective wellbeing [30,31,53]. As people retire, it is inevitable that their orientation to Internet-enabled technologies is likely to change.

Our UK study reported in this paper explored everyday experiences of Internet use in *early retirement* and how this was made sense of by recent retirees as part of their daily lives to achieve wellbeing. As will be elaborated, we conducted Research through Design (RtD) [20] using an experience-centered approach [38,39]: design was practiced, not in response to research outputs with product ideas and directions, but as part of a generative process of inquiry combining interdisciplinary expertise in Self Psychology [25] alongside Interaction Design [51]. Our study involved the development and deployment of OnLines, a networked device that tracked the use of key online services used by a sample of six individuals who had retired in the last five years. Engaged with in the context of two pre- and post-deployment interviews conducted at home, this device presented each retiree with a real-time, visual display of their service use data. This data was used to prompt perspective taking and reflection with the retirees about how their online practices form part of their experience of early retirement. Following the deployment, a focus group was also held with three of the participants. Data was analyzed using phenomenological methods [23,35,60] to deliver new findings on self-functioning and wellbeing in the transition to retirement using Internet-enabled services.

Being Online as an Older Adult

A 'lifespan-oriented approach to HCI' [37] gains significance with recognition that more people are active online *across* their life course [42]. At the time of our study, in the UK, 42% of those aged 65 and over were active online,

with 29% active while mobile [63]. 20% of those adults aged 65-75 used a smartphone (up from 12% in 2012). Survey data also reveals 49% of Internet users aged 55-64 had a social media profile, as did 28% of those aged 65+ [45]. These statistics broadly demonstrate the importance for HCI researchers to attend to the needs of ageing populations of online technology users [11].

Logically there is overlap between the older adult and retiree populations. While there has been extensive HCI work on ageing populations and technology use (see Vines et al [64]), this rarely focuses on *transitional* perspectives. Notable exceptions include: a UK study by Lindley and Wallace of downsizing amongst seniors [34]; Brewer and Piper's US study of older adult bloggers in which the authors emphasize older adulthood as a period of growth [13]; Salovaara et al on the transitioning lives of late middle aged individuals in Sweden and Finland [56]; and Williams et al on Thai retirees' use of mobile technology [66]. Arguably, the period of *transition into retirement* holds unique challenges and opportunities around technology use amongst retirees [28], with potential impacts on those individuals' 'sense of self', expression of identity, and subjective wellbeing. Yet retirement remains relatively underexplored in HCI research [56]. It is important to note that workers retiring now are the first generation to have *potentially* used the Internet for a substantial portion of their working lives, which should impact commonly held perspectives on older adults' online literacies [5,42].

Our research is inspired by critiques [13,55,56,64,65] of previous work framing retirees as less tech-literate and more socially isolated. Such critical commentaries suggest alternative approaches to engaging older populations, for example, thinking of them as 'multifaceted' individuals [64] with substantial experience of various roles, identities and 'possible selves' [56] across their life course, and with valuable perspectives on technology design. A new HCI research agenda calls for more idiographic approaches that consider the complex lives of such individuals [64].

Paper aims
We support this agenda by reporting a qualitative study on how online services support self-functioning in retirees following this major life transition. Applying a theoretical perspective, Position Exchange Theory (PET) that is new to HCI [23,35], we analyze how the retirees made sense of their online activity, delivering findings that inform the strategic design of supportive online resources from a lifespan perspective. We make a three-fold contribution to the HCI field: advancing the lifespan-oriented approach by deepening understanding about the self as a *dialogical phenomenon* [38,39] that develops over time; advancing the ageing discourse by studying retirees' complex identities in the context of their life histories; and advancing discourse on Research through Design (RtD) by developing a 'design research artifact' [51] called OnLines for fostering participant reflection, informed by Self Psychology.

RELATED WORK
Retirement has been the topic of many studies in a range of disciplines, although remains relatively underexplored in HCI. In this section, we introduce literatures we speak to.

Retirement as a life transition
In psychology, gerontology and the health sciences, retiring from work is largely viewed as a significant life transition comprising distinct phases of activity and experience, each characterized by varying degrees of self-efficacy [16,50]. Pettican and Prior describe a pre-retirement phase of financial planning, followed by phase in which a sense of purpose is constructed, and then a phase of accepting retirement as a new life stage. Similarly, Butters [16] considers a series of transitional stages related to finding enjoyment, freedom and meaning during retirement as well as dealing with the psychological stress caused by leaving work and finally adapting to a routine. Butters' qualitative account draws on personal experience and presents retirement as an extension of independent, self-sufficient adult life rather than a period of loneliness, illness and cognitive decline; the end of independent life signals the end of retirement. This view is complemented by Kim and Moen who suggest "retirement is becoming more of a midlife transition" [31, p.85]. They call for an '*ecological*' approach to studying retirement that considers human agency on the part of the retiring individual, along with the personal, social *circumstances* in which people retire. This, the authors argue, is critical for understanding subjective wellbeing during this transitional period. They highlight the *complexity* of the transition, emphasizing continuity as well as change in retirees' expressions of personhood.

Studies of technology use in retirement
The complex social psychology of older adulthood has been acknowledged in HCI, as has its *ecological* dimensions because of HCI's focus on technology interaction [11,64]. Previous research on the older adult population (which includes retirees) has increasingly focused on online interactions and social media use. Burmeister [14] highlights the importance of online communities to older adults for finding and sharing information, for emotional support about shared experiences, and for a sense of belonging. Studies have explored supportive technology to combat social isolation and loneliness [19,49,3], which may be related to physically relocating [34,48,54], or managing pain and chronic illness [8], or to understand perceived barriers to Internet use and online publishing, for example because of older adults' concerns about threats to personal privacy and security [1,32,43,67]. Studies of older adults' Internet use show a relative lack of 'online participatory culture' through social media compared to younger generations [10,27], raising issues and design implications for social inclusion and accessibility.

This last point has been challenged by Waycott et al [65], and Brewer and Piper [13]. They have found many older adults to be open to creative expression and social engagement online, as active producers of online media. Relatedly,

Rogers et al demonstrate opportunity and value in offering older adults technology toolkits that support empowerment through creative engagement, ideation and collaboration [55]. Commentators beyond the HCI field highlight the 'fun culture' in older adults' online communities [41] and the increased relevance of social media to these communities, reflecting older adults' positive orientation to their future [42]. Such recent studies suggest HCI design directions that acknowledge the *diversity* of orientations to new technology in this population [21,33,43]. It seems appropriate for HCI research to approach older adults as multifaceted, complex individuals who carry with them rich life experiences and nuanced perspectives on technology [56,64].

Studying personhood from a lifespan perspective
In our study we have applied a *new* theoretical perspective on human dialogicality to our HCI concerns with understanding and supporting recent retirees. Position Exchange Theory (PET) [23,35] has phenomenological foundations and draws on the philosophy of Dialogism [26] (also centrally informing experience-centered approaches in HCI [38,39]). PET conceptualizes *self-functioning* in terms of how people adopt and move between psychological 'positions of identity' [17] that have a physical, social, and institutional basis [23]. People are biophysical in the sense that they are embodied, and *their embodiment is enacted* in a social, technologically-mediated world [35, p.2]. In this way, 'personhood', by which we mean an individual's felt 'sense of self', is expressed in terms of both *intra-* and *inter*-personal dialogue. This 'socio-material' [ibid] conception of the self is complementary to ecological approaches that have longstanding relevance in HCI [9].

From a PET perspective, movement and dialogicality is a *developmental* activity in the self. People take on various 'social positions' to function and to relate to others. Significantly, PET enables an analysis of *how people move between social positions during their lifespan*. Self-functioning and personal growth is understood in the context of change, for example, how children may become parents and then grandparents, or how students become teachers, or how the young become old. As part of the developmental process, the person gathers an appreciation of perspectives (or social positions); for example, a teacher does not forget the experience of being a student; a retiree does not forget their position in the workplace. PET has been developed and applied in Self Psychology; and we suggest that, by providing a socio-material basis for understanding the self as developing and transitioning, PET also offers value to the HCI field to understand mediated interaction, especially for experience-centered [38,39] and lifespan-related research [37,18].

Research through Design for self-reflection
Our study also speaks to a growing HCI discourse on Research through Design (RtD), using the material language of design as a form of generative, practice-based inquiry [20] that may invite critical reflection [52]. Kinds of *design*

research artifacts in HCI [51] include technology probes [29], operational prototypes [51], provotypes [12], and most recently research products [44]. RtD approaches have been used in studies with older adults [62,24,15]. For example, Waycott et al [65] developed a novel iPad app that encouraged their older adult sample to foster online peer groups and new social connections by creating and sharing digital media in new ways; this design supported *new ways of exploring older adults as content producers*. In our study, the design research artifact was akin to a provotype [12] and supported participant sense making and reflection at interview – in an interdisciplinary inquiry. After Baumer et al [4,5], who have raised concern that HCI design studies often lack adequate conceptual definition of 'reflection', we demonstrate here a considered use of *design for reflection*; we offer a case example exploring dialogical self-functioning in mediated interactions [23,35,38,39].

STUDY DESIGN
Guided by phenomenology and dialogical thinking [38], our objective was to create a 'rich local picture' of the retirement transition by capturing idiographic accounts of lived experience from a small sample of six retirees. We also sought to be interventionist in their home lives, using 'defamiliarization' design strategies to invite them to pull perspective and reflect on mundane domestic activities [7].

We developed a novel design research artifact [51] called OnLines for home deployment with retirees. This was not a prototype technology for evaluation, but a sensitizing device and material provocation [12]. OnLines was designed to 'defamiliarize' participants about their daily online interactions, by presenting them with an interface display revealing a novel visual trace of ordinarily invisible patterns of activity. Our aim through deploying OnLines was to generate situated, socio-cultural understandings [7,58,59]. Participating retirees were emailed preliminary questions, and then interviewed at home, face-to-face, pre- and post-deployment of OnLines. A focus group was also held with three of the six to further discuss the deployment.

Design of OnLines as a Research Artifact
OnLines tracked a participant's use of particular Internet services (including apps, websites) in their home, displaying a real-time visualization of this use (Figure 1). Our previous research indicated that retirees had a diverse, non-social-media-centric online life [47], so for the current study we considered a range of Internet services, designing OnLines to monitor multiple channels. OnLines provided a dynamic view of its user's activity over the deployment, plus use of the same services by *others* in the sample.
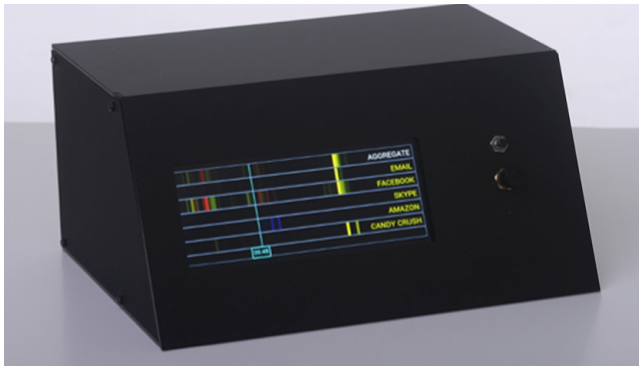
Figure 1. OnLines, a device visualizing patterns of Internet use

In 'Personal Mode', OnLines displayed six rows of information, one row for each service being monitored and an extra row creating an aggregate view of overall service use by the individual (Figure 2). The horizontal axis of this display depicted the time of day with 00:00 hours on the far left and 23:59 on the far right. The display centered its view at the current time, allowing the participant to see recent activity 'at a glance'. The display also indicated what time a specific position on the screen corresponded to. The device afforded touch-screen interactions for sliding this 'time indicator' across to a desired position, to encourage active exploration and review of daily patterns of service use.
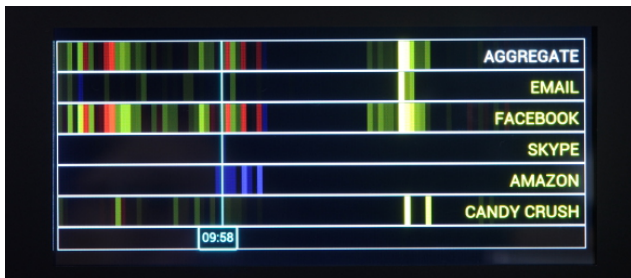
Figure 2. OnLines display showing 'Personal Mode' of use

OnLines created a password protected wireless access point in the participant's home. As this person browsed the Internet, the device analyzed the source and destination of each packet transferred to determine if they were connecting to the specific services being monitored. When OnLines found a connection to a relevant service, a line was drawn in the row matching that service, on the position indicating the time of the day when it was made (Figure 2). The lines' brightness represented the number of packets transferred to that service in a 10-minute window; the color represented the device making the connection.

Another feature of OnLines was a secondary display mode, or 'Social Mode' (Figure 3), accessible by pressing a button on the front of the device, allowing its user to compare their aggregate use of the services with other participating retirees in the sample. A physical dial on the panel allowed users to overlay several days of data to make repeated routines more evident, either in their own data or in others'.
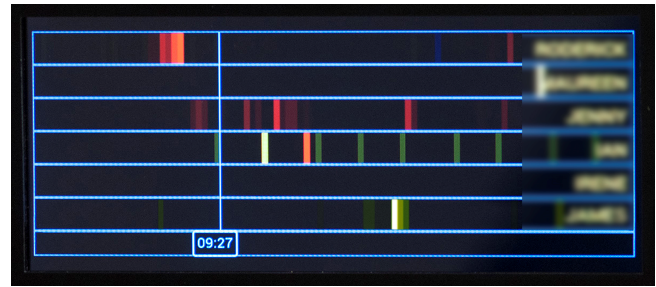
Figure 3. 'Social Mode' affording the reading and comparison of different (anonymized) participants' data across the sample

The simple functionality of OnLines enabled us to hone the *inquiring function* of the device. We made OnLines a standalone device rather than software so that it would have a conspicuous *presence* in the home, for on-going engagement in 'walk-up interaction'. We designed the interface to be unambiguous in *functionality* and easy to use, so that the usability would not detract from participant engagement with the displays that were open to interpretation and meaning making [59]. We were guided in this effort by the concept of *defamiliarization* [7], to support participants in exploring alternative positions on their daily lives that would prompt discussion at interview about *how they think they live versus how their lives are tracked and depicted*. The added functionality of 'Social Mode' was intended to support this. By juxtaposing individual logs of Internet use (Personal Mode, Figure 2) with of others' via Social Mode (Figure 3), and affording the switch between modes, OnLines provided a socio-material means to invite participant-researcher reflection.

Participants

Participants were a snowballed sample recruited through Voice North, a local organization supporting lifelong learning and the involvement of older adults in research projects. Our sample (n=6, 3M, 3F) all lived in or around Newcastle upon Tyne, UK. All had retired within five years. Details follow (pseudonyms are used).

Iris (57) is a former secretary at an accounts office. She retired unexpectedly five years ago due to health issues. She acquired her first home computer, tablet and smartphone on retiring. Before that, Internet use had all been work related.

Scott (63) is a former stores manager at a hospital. He retired five years ago because he could no longer find a job; this led him into depression. He had used the Internet at work for 25 years and a personal computer (PC) at home since the 1980s. He had used a mobile phone for nearly 20 years and acquired his first smartphone and tablet in retirement.

Susan (66) is a former accounts clerk. She retired gradually at 61, taking temporary employment before leaving work altogether. She provided care for her elderly parents. She had used a mobile phone for over 20 years, used PCs at work and home for over 30 years, and used the Internet and email at work and home since the early days of the Web.

Rob (69) is a former sales manager. He planned ahead for a gradual retirement, five years ago. He started using PCs, the Internet and email following retirement. He acquired his first smartphone two years ago and a tablet last year.

Eileen (73) is a former psychoanalyst. She retired gradually from her home-run practice, and retired fully three years ago. She used the Internet and email at work first, over 20 years ago, and then at home. She had used a mobile phone for about 15 years and acquired her first tablet last year.

Bill (73) first retired from the army in 1986. He then took jobs both as a local and international courier, stopping paid work four years ago. He started using an Internet-enabled PC and email during retirement. He now has four home PCs and acquired a smartphone a year ago.

Data collection and analytic procedure

Each participant emailed a list of their most frequently used Internet services. Most common were Email (Hotmail, Google mail), Facebook, Skype, Amazon and Candy Crush. OnLines was configured to monitor the home use of these five services. An OnLines device was deployed for three to four weeks in each participant's home. On the day of deployment we conducted an initial interview, focusing on the participant's orientation towards, and history of, digital technology use, on notions of online self-expression and experiences of retirement. We then set up OnLines, explaining its functionality and purpose. In line with our University ethics protocol, participants were made clear about the data that OnLines collected, visualized, and shared, before consenting to take part.

During the deployment, participants only kept in touch with the research team for occasional device trouble-shooting. During this period, OnLines recorded and displayed their use of the five services. A post-deployment interview was conducted with each participant. This focused on their reflections of online activities prompted by the device displays. Further to this, we conducted a group interview with three of our participants, those available to meet (Rob, Bill, Iris), to further interpret OnLines traces in a social context. Anonymized aggregate visualizations, one for each participant's recorded activity across the deployment, were presented at this interview. Interpretative Phenomenological Analysis (IPA) [60] was used to analyze transcribed interview audio-recordings about participant-researcher sense making at all the interviews. Emergent IPA themes captured the felt experiences of participants, in particular emphasizing the interpersonal exchanges at interview.

Following the study, we applied PET [23,35] to enable a further analysis focusing on accounts of *developmental* transformation in retirement – to explore more specifically the workings of the developing self in transition. With its phenomenological basis, PET was compatible with IPA whilst providing new conceptual tools on position exchange for making sense of the data. We reviewed initial IPA themes, supportive codes and data extracts, to identify participant expressions of differing *identity positions* that were adopted in the social context of interpersonal exchanges and technology-mediated interactions.

FINDINGS

We now present our findings, drawing out recent retirees' sense making on 'being online'. We present idiographic examples from the interviews to knit together a 'rich picture' of heterogeneity that supports the new HCI ageing agenda. Findings are organized around position exchanges in the self that our PET analysis identified [23,35] and form the basis for understanding transitional experiences. Each subsection considers the impact of OnLines for exploring the self in transition.

One general finding is that the retirees in our sample were online for a significant percentage of each day (revealed by OnLines' records); and each person had their own distinct pattern (or habit) of daily Internet use. To summarize how participants responded to interacting with OnLines, all six said that the device did not feel intrusive as it recorded their daily activity at home. All said that they didn't physically interact with the device *every* day during the deployment (e.g. by changing Personal/Social Modes). However at the exit interviews the aggregate personal displays of data recorded during the deployment proved more curious and revelatory to participants. The aggregates illustrated *how much* they had been online on a daily basis. Iris offered an analogy about OnLines visualization in Social Mode: "*They're like books on their shelves, aren't they? You can see patterns and things. I think most people seem to use the Internet quite a bit really.*" (Exit Interview)

By showing differing patterns of activity, the aggregate displays invited participant-researcher speculation at interview about why online activity was so high at times, and how one's personal practices may differ to others'. The following extract from Susan's exit interview captures her reading an aggregate display of her data collected *across* the deployment, and making sense of 'always being online'. The display also prompted talk about her Internet use beyond the five represented services:

"*It has surprised me that there is this definite pattern of usage. It (OnLines) is telling me I have things turned on all the time, and I would be lost without having that access. Yes, I have my computer on every day. I switch it on in the morning. I switch it off when I go to bed at night. If I'm going out I tend just to put the lid down and I'm using it for different things other than the things you were recording. There are other things that I'm using all the time.*" (Exit)

Being open to new experiences

Retirees were recruited through Voice North so were a self-selecting and *proactive* sample. At the entry interview in particular, each described being interested in trying new things, adopting new devices, meeting new people, organizing their life in a new way, and trying to achieve a balanced and healthy lifestyle.

Figure 4. OnLines aggregate of Iris's total recorded Internet service use over 24 hours, across the four-week deployment

A feature of the transition for our sample was adopting new technology and being excited by its potential. Eileen described her recent tablet purchase as "*very exciting; I like it very much*", and Scott said: "*I wouldn't know what to do without mine.*" Iris described enthusiastically exploring new applications (apps) on her recently acquired tablet and smartphone, 'interested to find out how they work': "*At the time, I hadn't realized what apps were and how you could use them. So really, it was just, "Oh, what's that button for?" and then, "Oh, that's what that is," and I just went from there. So I've got lots of apps on now*" (Entry). This finding bolsters extant work demonstrating the proactivity and serious interest of retirees to explore new technologies.

From Employee to Retiree
The first position exchange we explore is 'from the employed self to the retired self', moving from work into retirement, meditated by Internet use. Susan described this as a shift to "*looking at things I want to do*":

"*My Internet use is more pleasurable since I've retired. I would use it at work, and then at home it would be an extension of work. Whereas now I'm doing hobby things and travelling, so I'm looking at it to expand what I'm doing in retirement, and that is pleasurable.*" (Entry)

Like Susan, Eileen retired gradually over time, using the Internet at both home and work during this time. She said her work email was "*now shut down*", and her home one "*very active*" (Entry). She described the emotional impact:
"*For me, it wasn't quite so traumatic because I worked full-time and then half-time and then I retired, so it was a very gradual process. I had to learn a different system of living. My daily patterns were different. When I ate was different. Setting up a whole new group of interests - that occupied me a lot. It didn't, for me, seem particularly negative, because I had managed it over a period of time.*"

Bill also retired gradually. He described how attending a local college during this transition to learn how to use the Internet profoundly shaped his experience of retiring, and of using computers. "*I learnt about the Internet because I knew about it but I didn't know how to use it. From then it's just grown. Now, I'm addicted to computers.*" (Entry)

Rob described how his increasingly heavy Internet use has been a positive feature of retiring: "*The transition has been very interesting, from working to having the freedom to go anywhere and do anything ... I use the Internet a lot, lot more*" (Entry). At his exit interview, Rob further communicated its value: "*The Internet is fantastic, I don't know how we ever did without it*" (Exit); his comment echoed Susan saying (above) she would be 'lost without it'. Studying her OnLines aggregate display, Susan described how 'being online' in a leisurely mode came with a sense of personal freedom that enabled her to be open to learning new things,

developing hobbies: "*I've taken up knitting and there are a lot of YouTube videos to do with the technology of knitting, which I've found really useful*" (Exit).

Beyond opportunities in retirement for personal growth by adopting hobbies, there was opportunity to actively reflect on attitudes and orientations to life, and technology was seen to support this process. Iris said: "*It definitely makes your life easier, having access to the Internet, because you can rethink things*" (Entry). Bill claimed: "*Being on the Internet broadened my horizons, I've learnt a lot*" (Exit).

For many, the transition in roles and activities required finding a new purpose to living. Our retirees indicated that they needed to keep busy, and being online motivated this sense of busyness. As Bill described: "*I can't stop work, I've got to do something, I need a reason to get out of bed in the morning, a reason to keep me out of the pub*" (Entry). He added later: "*That's what the Internet does, it nudges you along, it's a trigger that starts you thinking*" (Exit).

From Browser to Communicator (Becoming social online)
Our analysis revealed another position exchange as a feature of transitional experience, in which the retirees developed new relationships and community memberships online and offline that were centrally scaffolded by Internet use. Activity shifted from searching and exploring online places and information, to *being online with others* and collaborating and sharing information online.

Rob described how face-to-face chat would prompt Internet browsing: "*If someone says 'Do you know about such-and-such?' I'll look it up on Google, I'll see something that I think is interesting, and that'll follow on to another search*" (Exit). Susan spoke of conducting research online with motivations to support her social activities in groups she had joined post-retirement: "*I'm in a history group and we're doing information about Catherine of Aragon, so I will be researching her quite a lot on the Internet*" (Entry). For Scott, Internet technologies had become vital tools for *coordinating* the kinds of social action that retirees like Susan were engaging in; for Scott it was the coordination of a walking group that he joined in retirement: "*Yes, we keep in contact with emails, we have a website which members go to, they can download the walking lists, they can download leaflets and things like that.*"

Eileen and Bill described discovering Scrabble on Facebook, pointing to how it had become about social exchange. For Bill, Facebook Scrabble – and the Internet more generally – was important because he lived alone and it provided social interaction: "*I meet people from other countries, other different types of people, and beside the Scrabble board there's a chat column. You can pass messages to each other*" (Exit).

For many participants seeing Skype use logged on OnLines prompted reflection on adopting video communication. Iris commented: "*It was amazing how many older people were using Skype to talk to grandchildren*" (Group Interview). Our participants said repeatedly that retirees who they knew were doing this, and not just with family. Bill described connecting to other audiences through Skype; he participated in an experimental educational program called Skype Seniors, in which he held Skype calls with school pupils in order to share knowledge about specialist subject matter: "*On a certain date, certain time, you've got everything switched on and you sit there and the school kids in the classroom are there and they ask you questions, you answer them, and you have a little bit of a discussion*" (Entry). All our retirees described developing social positions as communicators who were inextricably linked to online interaction as a feature of retiring.

From Private Self to Online Self

The retirees also described a tension raised in mediated communication on balancing social interaction with self-disclosure online. Whilst, in their own ways, they had all adopted social media in retirement, and Facebook more than other social network sites (SNS), they also expressed reluctance to post (self-publish) on those sites, reinforcing extant HCI work on the subject. For example, Eileen said she would "only look" but not post: "*I see what my friends are doing, what kind of messages they're sending, I see my daughter's photographs*" (Entry). Susan echoed Eileen in her orientation: "*I like to see what's happening to friends, so Facebook is important*": "*I don't like Facebook, but it's a convenient way of almost seeing what's going on. I'm what my friend calls a voyeur. I look to see what's happening amongst people, but I don't actually put anything on about me, I don't share anything*" (Exit). Iris was explicitly guarded: "*sometimes people put comments, but I don't think I would be too open with my thoughts*" (Exit).

Rob, Scott and Bill described feeling 'in control' of their self-disclosure online because they thought carefully about how to configure settings and what personal information to post. In Rob's words: "*I'm entirely in control of that, there's been no outside influence, and with what's going on in the world today, you've got to be very, very careful what you put on the Internet*" (Entry). Talking about Facebook, he expressed wariness about security, for example "*someone might wreck my house if I say I'm away*" (Entry). Scott described being careful to "set different levels of security on Facebook" (Entry) for posting photographs about the walking group. Bill's strategy was to create "*pretend identities*" (i.e. false): "*If you don't have a true identity to begin with they can't steal your identity*" (Exit).

Susan conceptualized a public-facing sense of self that was *less about identity* and more about a trace of online activity: "*I wouldn't have thought my Internet use would have represented my personality, but it would obviously represent my interests*" (Entry). Susan instead saw her online trace as

a 'personal chronicle'. This was then drawn out through the OnLines' displays of her activity; reflecting on these she understood such digital footprints as a partial representation of herself: "*OnLines does represent how the Internet fits into my lifestyle – it's giving you a snapshot of bits but not of the whole picture*" (Exit). Iris reflected on what her social media use may portray about her: "*taking part in things and 'this is what interests me', sort of thing*"; "*I suppose people get a sketchy sort of picture of what your interests are - and what you're talking about, and you can agree about it, comment, or share experiences*" (Exit). Eileen viewed social media posting behavior as generational:

"*My grandchildren have grown up with Internet and social media. They're very comfortable with that. Facebook is part of their life. I don't think many of my age group use it constantly like earlier generations do.*" (Exit)

In sum, being open to new experiences online was found, for these proactive retirees, to foster shared interests and constructive exchange through an often mediated and consciously social version of oneself.

Balancing and structuring time online

Another major theme that we identified was the retirees' active concern with balancing time in their daily lives between being on- and off-line, being at home and 'getting out', in the pursuit of wellbeing. *OnLines* displays were found to be provocative at the Exit Interviews and Group Interview for interpreting patterns of heavy Internet use.

From Learner to Facilitator, to Organizer

We have reported how the adoption of Internet-enabled technologies made for new social experiences that needed to be made sense of. Further illuminating the 'retired self' as dynamic and developing, our participants talked at length about taking on new roles in voluntary work that facilitated others. All said they did voluntary work, and there was a strong social dimension to this activity that was found to be self-efficacious, rewarding; this work was most often established with support of mediated communication, but took place offline in collocated, face-to-face interaction.

Rob, who only learned how to use a computer and the Internet upon retiring, described a trajectory from being a self-declared novice about Internet-enabled computing, to a mentor to other retirees and older adults: "*I'm really virtually self taught about the Internet; I now do some computing mentoring, I find the Internet is good for that*" (Entry). Rob described voluntarily mentoring for a number of charitable organizations, work that involved constructive, social engagement: "*In fact, my next door neighbor, who's a young man, says that I've got a better social life than him*".

Similar to Rob, Bill's transition into retirement involved a trajectory from Student to a voluntary Mentor role for the educational program delivered via Skype, introduced above. In this Mentor role, he modestly described himself as "an old knacker" but knowing he could offer 'expert' insight from his rich life experience in the context of a student learning

environment: "*There's a calendar and a school teacher will put something on, 'We would like to discuss something with an old knacker', and they describe what kind of class they've got, how old they are and what they're looking for, then you volunteer to do this if you want to*" (Exit). In this context Bill also expressed self-efficacy; he could choose how he wanted to participate.

The voluntary Facilitator or Mentor roles structured retired life and supported positive self-functioning through social connection. Whilst these connections could take place online or offline, we further found all but one (Bill) explicitly 'going online' with the aim to *organize offline activities*. Scott described his online coordination of the walking group, introduced above. He described how the group helped him with his depression: "*I have never looked back since I started walking*" (Entry). Participation in the group was key to his retirement story:

"*I had to tell myself that I had retired because I ended up having a nervous breakdown - because I couldn't get a job. I had to change my lifestyle completely. I became a volunteer walk leader, and I love it.*" (Entry)

The online interaction is important for Scott within his community of volunteer walk leaders:

"*My colleagues and I use the Internet extensively, forever sending each other information. We like to keep in contact with what's going on in different fields and go to various meetings, like the mental health panel. So we can give information out to the people who need it. We feel we've got a social responsibility, a duty of care for our walkers. We're not just a walking group. We feel we should pass on information because we're a social group as well.*" (Entry)

At his Exit Interview, Scott studied the OnLines display in Social Mode and was asked to interpret the other participants' online patterns of activity. He responded:

"*Some of them are a lot busier than me online. I am not on as much as they are. That's probably because I have got an active lifestyle outside, which I think it is a healthy thing. It isn't too healthy to be on the Internet all the time.*" (Exit)

This led Scott to voice what he saw as emerging social or societal pressures about getting online and being online:

The government seems to be doing everything online these days, which is a bit unfortunate if you are not online. A few of our walkers don't have the Internet so we have to produce newsletters. Some have got computers but they are not necessarily on the Internet and a bit wary of it." (Exit)

The extent of online activity that OnLines depicted was a surprise to Scott and invited him to think about the future:

"*I think it's important whoever develops this technology that they look ahead at where it's going so that we don't lose some of the social interaction. For my generation, I prefer to talk to people face to face. I think it's important.*"

From Addict to Responsible User

Scott and the other participants talked about transitional experiences with new technologies that led them from 'online immersion' in early retirement to finding routine and structure around Internet use as retirement progressed. Bill, Iris and Rob repeatedly described being "addicted" to computers. Rob's OnLines personal mode display showed intense daily use of some services, which he read as: "*Emails, Candy Crush, and Candy Crush and Candy Crush and Candy Crush, emails.*" And as Rob highlighted at the Group Interview, the device "was only giving a representation of what one does in the house"; he emphasized his use of mobile Internet services when away from home, as did Iris and Bill.

Interpreting OnLines' Social Mode, Eileen found it surprising that other participants didn't leave their homes more and also was surprised by their late-night activity online: "*I'm interested in the comparison between the different participants, and I can imagine what that says about them and their pattern, and that's interesting*" (Exit); she found it particularly intriguing that "*Rob is always on*". Bill's OnLines aggregate offered a new perspective on his habits: "*Yes, it's a bit scary the amount of time I spend looking at things online (Laughter); I do have a habit of every time my phone bleeps I check the email*" (Exit). And whilst OnLines was not intended as a product-oriented prototype, Bill identified practical value in displays that had similar functional features as OnLines for logging the extent of online activity, to help him live a healthy life:

"*If I found, by studying the information on here, that I was spending a large percentage of my time on a computer, on the Internet, that would worry me. If I saw a pattern developing that meant that I didn't have a rounded life, where the sun was shining, and I should walk in the park, and I was sitting at home playing on the computer, or in a pub, playing on my phone, spending too much time online, which wasn't doing me any good, that would worry me.*"

Bill took issue with the abstract nature of the OnLines' interface, however, wishing for higher resolution and analysis of presented records: "*There wasn't enough information displayed with the reason why, with a description of the analysis, that would mean more to me*" (Group Interview). Iris, who had enthusiastically explored new apps in early retirement, spoke at the group interview about her efforts to 'ease off' being online at home:

"*I did make a change after using that (OnLines), because it made me realize how long I was spending on emails, on games. I've got some of my life back! When I was at work, I hadn't realized how active I was, and when I left I put weight on, because on the Internet for a bit and before you know it, you've been sitting down for three hours. Time is more elastic. I now try to be quite structured with the day. I try to use the Internet in the morning, then have a gap, and play on the tablet in the night time. So I'm not on all day.*"

At the group interview, Bill, Rob, and Iris discussed their aggregate visualizations that were displayed together (e.g. Figure 4). In one instance, Rob and Iris talked about their respective late night gaming that OnLines captured. Rob explained Candy Crush play: "*That's when I woke up for a few hours and just thought 'Oh I'll just get back on and see if I can get to the next level'*". In response, Iris talked about being stuck on a level too, and then added: "*I like things to enhance my life, not take it over, but there is that danger when it's there all the time.*" Rob then said: "*I agree, you look at everybody on the bus and they're all sitting with phones, and it has come to us now, we're all sitting like that; it does tend to take over.*" At this group interview, the participants raised the conflicts they were resolving in themselves, on being actively engaged with new online media whilst taking time to live 'a rounded life.'

These findings have painted a 'rich picture' of how online activities feature in the transitioning lives of retirees. We now discuss the implications of these insights for HCI.

DISCUSSION

To reiterate, our sample was a group of recent retirees who were recruited via a UK charitable organization for whom they volunteer. They were socially engaged individuals who 'self-selected' to participate in research that would offer them new experiences, new learning, and new self-knowledge. Our findings reflect individuals enthusiastic to adopt new digital technologies in their transition to retirement, as potentially heavy users. We have also illuminated retirement as a time, not just of independent living and working, but also of continued personal growth [13]. We have shown how *changes in social positions* during this transition have presented opportunities for finding new purposes to living, new 'systems of living' (after Eileen), and for new experiences and values. We have demonstrated how these opportunities were motivated and supported by Internet-enabled computing habits practiced at home and, for Rob, Iris and Bill, when out and mobile [14].

Understanding experience in the context of the lifespan

Our findings contribute to a new ageing discourse in HCI [55,56,64] that invites holistic, experience-centered, and idiographic approaches to reconfigure the older adult as a multi-faceted and self-efficacious technology user. Our study acknowledges that retiring, as a major life transition, can relate to multiple generations of people, of varying *ages* and differing circumstances; we have found this even in our sample of six with Iris, Scott and Bill retiring early. Also, the transition can be gradual, encompassing working life to varying extents, as we found with Bill, Eileen, and Susan. Our lifespan-oriented approach [37] ensured that our study design, recruitment process and line of questioning took into account retirees' previous life experiences that informed their orientation to technology use, and their plans for things they want to pursue now and in the future. Our IPA analysis [60] informed by PET [23,35] attended to developing orientations in light of new life experiences.

Studying personhood as a dialogical phenomenon

We found retirees' adoption and use of Internet-enabled devices and services featured significantly in their transitional experiences and activities. We demonstrated how this was integral to their daily lives to express a sense of who they are and to achieve a sense of wellbeing.

PET has allowed us to understand digital technology use as a socio-material basis for personhood and social psychological functioning that is embodied and enacted in the world. It has provided a new conceptual lens for understanding how retirees shift between, and accumulate, different identity positions in their transitioning experiences, and how this is both an intra- and interpersonal exchange that is significantly mediated by technology adoption. For example, our retirees voiced how they were, at times, grappling with conflicting social positions expressed through technology use, such as Online Addict and Responsible User, or Private Self and Public Self. PET enabled an articulation of 'digital personhood' that reflects the complexity of the technologically mediated self. Developing lifespan-oriented HCI from the perspective offered by PET, we can describe how retirees expressed 'agility' in their sense of self, for identifying with and taking the perspectives of others: younger generations 'who are always online', or older adults who they mentored – who are Internet Novices or wary of the Internet, or their future self who they wanted to be happy and well. Such phenomena reveal sophisticated self-knowledge, made up of social positions accumulated over the life course [23,35]. For HCI, the PET lens on the retirement transition aligns well with the new ageing agenda [64], by engaging with the potential for older adults to offer sophisticated understanding (wisdom [55]) and expertise on technology, its users and practices, and its future directions.

Research through design to support self-reflection

OnLines was designed as a research artifact [51] to foster self-reflection on online activity. However, we found issues with the design that affected its efficacy. We designed it to be readable in 'walk-up interaction' at home, however two participants (Bill, Rob) struggled to read the aggregate displays without later clarification at interview. Bill felt the displays lacked granularity and labeling to help him meaningfully interpret the information on his own – he wished to be able to discern more detail (e.g. statistics, measurements) about what he was doing and for how long. The real value that OnLines held during the deployment was to *record* data that could be visualized and reviewed *at interview*. The two OnLines display modes proved very useful at interview for fostering perspective taking. Participants explicitly stated that the aggregates helped them to identify patterns of service use, illuminating activities, habits, and behaviors that were 'surprising', 'revelatory' and prompted self-reflection, challenging assumed technology use [7,58]. This interpretation was set in the context of others' online activity; the design also provided support for self-reflection that was intrinsically socially connected, which was helpful for our analytic engagement with

'position exchange', providing a case example of RtD to support dialogical exchange [4,5]. Finally, as an intervention, OnLines invited participants to visualize their online activity in terms of 'traces' or 'patterns' that could be construed as a public-facing digital footprint. Whilst this visualization was abstract (and different in representational terms to, for example, social media profiles, blog content or other personal information online that could have been engaged), it worked well to support our line of questioning, on the general concern of Internet-enabled computing habits in early retirement.

Strategic design considerations for online services
Our findings offer transferable insight for HCI researchers.

Develop platforms to support transition from (and to) work
The retirees were clear that they had a wealth of experience to put to use, and needed to keep busy. Knowledge and skill-share platforms should utilize this resource. Initiatives such as *Skype Elders* in which older adults provide educational support to schools via Skype seems exemplary of this kind of platform, and could be expanded for learning and training. This is not assuming a voluntary basis, because we found that many retirees wished to work and earn in ways that suited their changing lifestyles.

Scaffold community-of-interest building by retirees
The retirees spoke of becoming social online. They spent considerable time and effort connecting with others, coordinating mediated interaction and community building, while *recognizing and accommodating differences* in members' orientations to the adoption of new technologies, or others' wariness of self-disclosure and self-publishing online [27]. Building on [13,55,56,65], we provide new evidence from a UK population of the scope of service design directions that could afford tools to tech-savvy retirees, and to those who are willing to learn, to *create* and *configure* their own social communities. These tools should leverage online resources and mediated interaction alongside traditional modes of communication to facilitate innovative community engagement by retirees with *diverse* expertise and *mixed* digital literacy.

Make lightweight tools for self-reflection and wellbeing
Retirees showed active interest in technology interfaces that could visualize their recorded Internet use and be informative about habits and practices of daily living, to invite self-reflection about *achieving wellbeing in the transition* into retirement. Participants also saw value in being able to compare this with others', subject to a level of anonymity. They acknowledged a tension between being encouraged within society to spend time online, and to get outside and be active, and felt that a tool delivered in hardware or in software might be useful to achieve balance in this respect, to gain self-understanding.

Consider the changing nature of the retiree population
Our retirees' sample was multigenerational, even though all had retired within five years. It is crucial to understand that the experience of those retiring today is fundamentally different from those retiring even seven years ago, and will be fundamentally different from those retiring in seven years' time. The extent and nature of technology use in the workplace is always changing; many who retire in future generations will have been born as digital natives. Orientations to technology adoption and use in retirement are *continually shifting*, and this phenomenon is important for HCI researchers to consider when configuring users in the retiree population. Furthermore, tools and services should be designed as adaptable to meet the potentially developing needs and interests of this population.

Limitations
We acknowledge in closing that our study engaged an idiographic sample that is non-representative. However our findings importantly replicate and develop a diverse corpus of qualitative studies addressing for HCI the complexity of human experience, epitomized by living through a major life transition. We have also introduced a new theoretical perspective with purchase in HCI: PET has offered us a set of sensitizing concepts for guiding and deepening phenomenological analysis. But we recognize the need, in future work, to explore the methodological framing of PET for the HCI community, to enable researchers to systematically study dialogical self-functioning.

CONCLUSION
Retirement remains an underexplored subject of HCI research. We have presented findings from a study about how 'being online' in daily life supports individuals transitioning into retirement. Introducing a new theoretical perspective on dialogical self-functioning, our analysis offers HCI new idiographic insight about how changes in roles during retirement, and the adoption of new 'identity positions', may be centrally supported by Internet-enabled computing in order to achieve personal growth and wellbeing. We have demonstrated how this developmental activity is fundamentally social and how technology can play a significant and constructive role in fostering and mobilizing social connection. With this we contribute to the new HCI ageing agenda and lifespan-oriented discourse a qualitative UK case that portrays retirees and older adults as complex, multifaceted individuals with varied orientations to new technology based on their diverse life experiences across the lifespan. We offer strategic design considerations for supportive online resources that acknowledge this individuality and diversity. Finally we contribute to RtD discourse a case example of a design research artifact fostering self-reflection and participant-researcher dialogue for interdisciplinary inquiry engaging Self Psychology.

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