

# Technology's Transformative effects on When, Where and How Individuals Work: A grounded-narrative approach

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## Abstract

*This paper reports on an exploratory study of perceptions of the effects of the impact of technology on the way mobile workers work and live. Narrative enquiry was used to gather stories from people using technology enabled mobility tools, and grounded theory was used to analyse the data. Narrative enquiry allowed participants to tell the stories that they perceived to be important and grounded theory permitted emergence of a meta-narrative that revolved around the transformative effects of technology on the way the participants work and how technology transforms the participants and their relationship to work. Key sub-themes are presented which detail these transformations. We frame these transformations through Kakihara & Sørensen's [1] theory of the three interrelated dimensions of mobile-human interaction: spatial, temporal, and contextual. Although exploratory in nature, implications for research and practice are suggested.*

## 1. Introduction

For much of modern times, work was done at the employers' premises and home life was separate. For the most part technology enabling the employee to work at home was not available. Exceptions were the telephone and the briefcase, used for bringing paperwork home. The telephone provided interactivity but required another person to be working after hours (at home or in the office). Paperwork involved physically carrying documents back and forth. With the introduction in the very late 20<sup>th</sup> century of technology such as home computers and the Internet, it became possible to work at home at anytime by being able to access information (documents) and people. The evolution of services based on mobile technologies increased access between the organization and the worker regardless of the physical location of either. The personal computer and particularly wireless technology accelerated these trends as did the Blackberry and similar devices. With each new wave of technology, the possibility existed for people to adopt new work styles. The question we ask in this paper is "what effects are personal productivity technologies, such as mobile devices, laptops, and broadband, having on individuals in their work and non work lives?"

One effect of current technology, is that people (both employers and employees) now interact with

technology in an anytime-anyplace paradigm, that inevitably draws in factors/variables, such as family, non-work time, not accounted for in previous theories. Although we present a brief overview of existing theories that inform this research, we believe that none of them completely capture what is actually happening as people begin to freely move between the boundaries of work, home, commuting, and leisure.

This paper reports on exploratory research that investigates early technology adopters' perceptions of the effects of mobility-enabling technologies on their work and non work lives. Using narrative inquiry and grounded theory techniques to gather and analyse data, we allow these early adopters to tell their own stories about how they use ICT in work and how these technologies influence and affect the way they work and live. We have chosen these methods to collect and analyse data rather than beginning with theory, as we wanted to attempt to get the fullest and most personal accounts of the human technology interface without the limits that a theoretical lens might impose [2, 3].

In the next section we summarize the key theories that inform traditional organizationally-influenced technology adoption and use theory as well as more recent theories from the mobile literature. We also look at work-life balance literature. Then we discuss why and how we have used narrative inquiry to collect data and grounded theory techniques to analyse the data. We then present a meta-narrative based on our grounded analysis, followed by excerpts from the participants' stories to highlight important sub-themes and discuss these findings in light of work done by Kakihara & Sørensen [1] on mobility. Finally, we draw out implications for research and practice.

## 2. Literature

From its inception the field of Information Systems (IS) has been looking to explain the multitude of relationships between people and technology: how people use technology, why they use technology, what factors influence adoption and use, etc. Predominantly the research and emergent theories have had an organizational perspective on technology adoption and use. More recently, research has appeared that pays special attention to mobile

technology [1, 4-8]. While much of it is still organizationally based, some of it has, followed the mobile nature of the technology out of the organizational door, to look more deeply at the increasingly blurred relationship between the technology and individual users.

There are numerous theories that seek to explain the relationship between people and technology [9, 10]. Significant among these is the idea of technological determinism, which suggests that technology is a primary causal factor in societal change [11-14]. Other theorists have sought to explain the relationships, both in terms of structures and processes, between technology, individuals and organizations [10, 15-20]. There are also theories around mobility, that have looked at how mobile technologies have brought work out beyond organizational boundaries, but with few exceptions, they have not looked at how the influences of the 'outside' environment impact on how work is done with technologies that enable mobility and a work anytime anyplace capability. Here we briefly examine some of the relevant theoretical and empirical work on mobility.

As with the more traditional adoption-use theories, mobile HCI (human computer interaction) literature has tended to focus on mobile technology use for work purposes within the work setting [21]. Even so, according to Sørensen & Gibson [22] empirical validation and fieldwork that looks at professional work practices as they are mediated by technology is lacking. There is also research on the social use of technology within social settings [6, 21]. Only recently has there been research looking at work-life boundary crossing use of mobile technology. For example, Sadler et al. [21] found that mobile phones were used primarily to manage personal activities unrelated to work. In another example, Lowry and Moskos [7] studied the impact of the mobile phone on work-life balance and concluded that there were both positive and negative effects depending on a range of contextual factors.

A set of statistical data on mobile phone use based on a survey of 16,500 British adults was recently released [23]. Data relevant to this paper showed that, of the nearly 50% of people who use their mobile phone for work, 24% do so regularly. As many as 47% hardly ever turn their phone off. Sixty-one percent say mobile phones have improved the quality of their lives. On the downside, however, as a result of using a work mobile phone 41% think they are too much at the beck and call of their employer.

Kakihara & Sørensen [1] have sought to get beyond the functional analysis of how mobile technology can overcome geographical distance and consider the theoretical implications of mobility in

the context of the "interaction that people perform". This interaction necessarily extends beyond work environments as the technology accompanies the people. They discuss the three interrelated dimensions of mobile-human interaction: spatial, temporal, and contextual and discuss aspects of interaction in each dimension as well as extended and more abstract perspectives (e.g. spatial mobility includes the geographical mobility of people, but also the "global flux of objects (Ipod, symbols, and space itself)").

Kakihara & Sørensen [1] go on to develop the metaphor of 'fluidity', borrowed from the ideas of social topology and fluid metaphor [24]. Mol & Law [24] proposed three distinct social topologies – region, network and fluid. Social topologies appear to have a particular resonance with the effects of mobile technology. In the topology of 'region' objects are clustered together and boundaries are drawn around them. In the context of work-life, regions signify the separate domains of work and home. In the 'network' topology, connections are predicated on relationships that make the distance between the nodes in the network relative. In the language of work and non-work, networked relationships extend beyond the boundaries of work through time and space. Networks are predicated on the use of current and older technologies such as phones, fax, computers, Internet, etc. In the 'fluid' topology, "neither boundaries nor relations mark the difference between one place and another". Instead, boundaries come and go, allow leakage, or disappear all together, while relations transform themselves without fracture. The technologies that facilitate the breakdown of boundaries and transform network relations are the emerging technologies such as mobile phones, SMS, PDAs, laptops, and technologies that facilitate instant awareness (MSN, ICQ, SKYPE, location tracking devices, GPS).

It should not be thought that this erosion of boundaries is always driven by the organization. Individuals often achieve personal objectives in both their private and organizational lives by choosing to adopt mobile devices, or to use them in innovative ways. These objectives may relate to functional improvements or enhancement of personal status as Isaac, Leclercq, & Besseyre des Horts have found. Many fieldworkers appropriate mobile technologies because they feel more responsible with them, having the impression that mobile tools contribute to the development of their job which in turn leads them to assume more responsibilities. [6]

In the language of Kakihara & Sørensen [1], these technologies promote "complex social patterns of interaction among people (which are) played under increasing spatial, temporal and contextual mobility".

It appears that with the advent of mobile technologies, space, time context, and people merge and change in an ongoing dance of transformation.

### 3. Methodology

According to Sørensen & Gibson [22], the complexity of real-life technology use can not be captured in small-scale laboratory design projects, but rather requires understanding of the everyday practices of people. We have, therefore, adopted methodologies that allow us to capture this complexity. The methodology used in this research is in three parts. Firstly we used the techniques of narrative enquiry to collect data. We then used a combination of the methods of narrative enquiry and grounded theory to analyse and understand the data. From this analysis emerged a kind of meta-narrative that captured the essence of all the participants' stories. Thirdly, we went back through the participant's stories and pulled out mini-stories that highlight important elements of the meta-narrative. In this section we briefly discuss the methods used and the reasons for choosing them.

Sørensen & Gibson [22] used professionals as a sample group to investigate the use of mobile technologies in work. In choosing their sample, they explained that professionals tend to have a wide choice of technologies available to them from which to choose and as they tend to be members of teams in knowledge-intensive organizations needing to flexibly make decisions, interact with geographically-dispersed people and be themselves highly mobile. We have chosen a convenience sample of intensive technology users for our research. As they have had years of experience using technology in work and home, we expect that they will have gained a perspective on technology and its use that will provide valuable insight in helping us to understand the affects of technology on work-life balance.

#### 3.1. Narrative Enquiry

Narrative enquiry has become popular in a number of fields such as nursing and education, as well as organisational studies [3, 25-30], and is gaining respectability in information systems [31-34]. In this study, narrative enquiry allows us to collect rich accounts of how users experience technology.

Narrative is commonly identified as the artefact of the interaction between one telling a story, and the listener [35] or as Söderberg suggests, a retrospective interpretation of the story [36]. Generally, researchers use narrative method and story in order to access the worlds encountered by the storyteller. Conventionally a story is understood to be

... a first-person oral telling or retelling of events related to the personal or social experiences of an individual. Often these stories have a beginning, middle, and an end. Similar to basic elements found in good novels, these aspects involve a predicament, conflict, or struggle; a protagonist or character; and a sequence with implied causality (i.e., a plot) during which the predicament is resolved in some fashion. (Carter [30]).

While others insist that stories must embody a plot, Boje usefully liberates story from such constraints. Anticipating purist objections, and perhaps with tongue in cheek, he characterises as "improper storytelling" those stories which are "fragmented, non-linear, incoherent, collective, and pre-narrative" [25]. Consistent with the notion of retrospective interpretation, he goes on to define story as antenarrative, or the precursor to narrative. Experience tells us that many of the stories encountered every day are of just such a character, as opposed to the formally composed complete and tidy performances implied in the conventional definitions. It is precisely such antenarratives that have been obtained in the current research, and appropriate fragments of them are presented to support the conclusions reached.

#### 3.2. Grounded Theory

Recently, there have been a number of studies in IS that have made borrowed elements of grounded theory techniques, usually in data analysis [e.g. 37]. The most commonly borrowed elements from traditional grounded theory are the coding techniques (open, axial and selective) used to analyse data. These coding techniques were used in this study.

#### 3.3. Using Narrative Enquiry and Grounded Theory to Gather and Analyse Data

In this pilot study, a collection of stories have been obtained in one-on-one meetings of 30 to 60 minute duration, from a convenience sample of eleven adults in Wellington, New Zealand. Three of these participants work in the public sector, three in mid to large size technology-based organizations, ones as an academic, two as consultants, and two as independent entrepreneurs. As previously indicated, the participants were intensive users of technology. Each participant was invited to describe a typical day and in particular, the ways in which they encountered technology in the course of such a day. Participants were encouraged to share their experiences with technology in their own way. The recorded stories were transcribed and checked for accuracy with the participants.

There are many possible approaches to the analysis of narrative, and it is generally acknowledged that there is neither a fixed recipe, nor even one “best way” to do it [38]. In this study we used the constant comparative analysis techniques of grounded theory. This commences with an exploration of the fine detail, and progresses to higher levels of abstraction, but iteratively returns to examine the detail in the light of the insights gained from the higher levels until saturation is achieved.

Data collection and analysis continued simultaneously (constant comparative method). We first imported the narrative transcripts into an NVIVO database and commenced open coding. Each narrative was perused, and broken into “speech units” containing one or more sentences embodying at least one significant idea. We examined each speech unit relevant to the research topic, looking for concepts relevant to the research topic. For each new concept identified, a code was created as a “free node” in the NVIVO database. Each speech unit was linked to as many existing or newly created nodes as the context required.

The coding process required us to interpret the speech acts holistically, drawing upon our theoretical sensitivity in such a way that we could associate them with abstract concepts even though the precise word had not been used by the participant. Approximately 130 codes were identified in the early iterations. Subsequently, concepts were merged where cognate codes had been used, changed where the researchers disagreed on original coding, and occasionally eliminated when the codes were judged to be trivial.

After several transcripts were analysed, axial coding was used to put data together in new ways, through seeking to identify concepts and the relationships between them by grouping the codes at a higher level of abstraction or meta-narrative of the combined transcripts. Using the iterative process of the constant comparative method we were able to strengthen our understanding of the stories and topics in the context of each narrative. In this part of the process, the researchers: (a) identify narrative fragments of particular interest and relevance in the context of the topic being explored; (b) to the extent that it is useful to do so, apply the principles of deconstruction analysis using the guidelines offered by Boje et al. [39], looking for dualities; and opposites, seeking what has not been said; and (c) seek to identify a meta-narrative that emerges from the narrative provided.

Approximately twenty themes eventually emerged from 130 initial codes. Extensive discussion took place around these themes. Examples of these themes were:

- Technologies

- Impact - social
- Impact - personal
- Impact - business
- Attitudes towards technology

By analysing the themes from a variety of perspectives — transcripts, coding, stories, narrative fragments and meta analysis — it became apparent that newer and higher levels of abstractions and relationships were forming. After further analysis and reflection, it became clear that transformation had emerged from the data as a key theme. The key theme is often the same as the basic social process, which can be understood as theoretical reflections and summarisations of the patterned and systematic flow of social life. Transformation was the key basic social process that concerned participants as they worked and lived with technology; it incorporated and explained the relationships between all the conceptual categories. At this point, coding was delimited to only those variables that related to the core category in sufficiently significant ways [40].

In the findings section that follows, we create a descriptive summary representation in the form of a meta-narrative that lays out our understandings and findings of the narrative data. Finally, in order to illustrate the meta-narrative of transformation, we returned to the transcripts and pulled out story fragments that both illustrate key sub themes of the meta narrative and demonstrate how the participants made sense of their experiences with technology[40].

## 4. Findings

In consideration of space limitations we summarize the findings of the grounded analysis, and rather than include, as is usually done, supporting quotations from the participants, we offer instead, expanded mini-stories that support the meta-narrative that emerged from the grounded analysis.

### 4.1. Participants and their Attitudes toward Technology

These participants viewed technology as something central to their lives, particularly their work lives. While participants were generally enthusiastic about technology they also recognised its place in the greater scheme of things, and occasionally identified the negative impacts of work-related technology on their private lives. The participants in this study regularly use a wide range of available technologies in a variety of work and home contexts. They used computers, cellphones, and PDAs. Connections were via wireless and broadband. They were inclined to use the latest software whenever possible. Some participants confessed to an

uncomplicated fascination with the technology for its own sake.

#### 4.2. The Meta-Narrative - Transformations in Work (and Life)

Transformation emerged as the meta-narrative that linked all the stories of these early adopters. The focus was on the nature of this transformation as it relates to people, technology and the workplace. Specifically we look at the inextricable links between how technology transforms the way the participants work and how technology transforms the participants (Figure 1). However, the participants' stories made it very clear that work and life outside of work (home) were also very strongly linked.

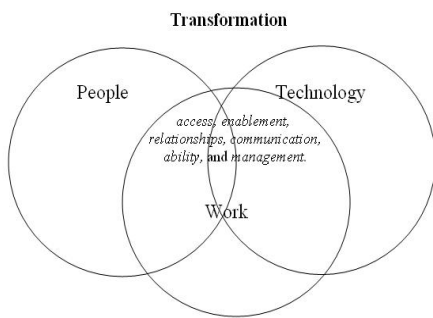


Figure 1: The Transformation of People, Technology and Work

It is clear from the participants' stories that technology transforms the ways they are working. It does this by enabling the participants to expand the scope of what is possible for them. This is done in a number of ways. For example, technology enables geographically distributed collaboration allowing participants to work from home or communicate with colleagues in other offices, cities and countries. Moreover, mobile technology also allows participants to work from just about anywhere. Most of the participants took for granted the ability to be Internet-connected from almost anywhere.

The technology also enables work across temporal boundaries. Some participants used technology to access information and services across international time zones. More controversially, technology allowed participants to blur not only the geographical demarcation between home and office but also the temporal one allowing them to access and be accessed anytime. This constant accessibility was seen as both a benefit and a drawback. Most wanted to be able to contact others at any time, but were less enthusiastic about being permanently contactable.

If the technology makes them always accessible, it also allows them to manage their work-life relationship in flexible and creative ways. These participants used technology to expand and enhance

relationships with their families. They did this in different ways. The outdoor activity entrepreneur was able to do much of his administrative and marketing work from home, using technology to find and communicate with clients. He only needed to leave the house to engage the client in the contracted outdoor activity. Other participants had also achieved flexible work schedules that allowed them to work from home or office, whichever was convenient to meet family and work obligations.

Technology, according to the participants, is clearly a two-edged sword. While the technology enables greater flexibility in work and home life, in order to avoid being overwhelmed by it, the participants were quite clear that they needed to have the ability to manage the technology. For many of them, this was a skill that they learned over time. They pointed out that although technology may be freely implemented in the office, training in how to effectively use it was not forthcoming. The learning process was usually through trial and error. The use and misuse of email provides a good example. E-mail was identified as a terse communication method that could result in intemperate responses, which might have detrimental effects on relationships. Indeed, it was pointed out that technology could outstrip the ability of people to use it effectively.

The quality of work and work-life transformation was highly dependent on their abilities to manage both the technology and themselves. Part of this management challenge was learning how to develop and manage relationships with others via technology as the example above with email illustrates. Another management challenge alluded to above, involves a form of time management. Since technology allows one to be always accessible, participants felt pressure from work to be accessible. But more unexpectedly the participants often struggled with self-induced pressure to make themselves accessible. In many cases it was difficult for them to turn off the technology and manage access in a way that allowed them to take full advantage of the possibilities of work-life balance enabled by technology. In fact for some of the participants, the boundary between work and home became blurred, and they indicated an uneasy sense of the need to establish appropriate understandings about separation between the two. Boundaries are further blurred as technology allows any time in between home and work to become 'up time'. Even holidays are not sacrosanct.

This overarching commitment to work raises an important managerial issue about the relationship between productivity and expectations. Technology increases productivity. It allows easier access to people, information and more efficient ways of working. Gains in productivity often lead to increased

expectations on the part of employers, but also among employees as well. According to the participants, not only must they manage their own expectations, but their managers and organisations must also understand that there are limits to how much employees can do. According to the participants in management roles, managers must help employees learn how to manage work-life balance. Indeed, this may be one of the looming workplace challenges. (This is also true in the family).

Part of the work-life balance revolves around the increased flexibility that technology allows. Both employees and management need to understand how this flexibility manifests and how it can be managed. Flexibility was frequently identified with having the freedom to trade blocks of time between work and leisure, particularly in order to meet family obligations. Unfortunately, the tradeoffs between technology, family, work and leisure are not always so clear, and the participants are struggling with just how technology is affecting their lives.

The tradeoffs that technology allows may be positive or may not be: it is not always clear. Part of the problem has to do with how carefully people monitor their use of technology. This monitoring needs to be at the personal level but equally importantly issues surrounding technology use outside the office need to be recognised and managed by organisations. Indeed as one participant indicated, if management wants to get the best and brightest people working for them, then it is going to have to not only allow the flexibility that employees need to organise their lives, but to encourage it. Technology is one of the keys that allow this sort of management transformation.

### 4.3. Key Sub Themes

In this section we offer a sample of significant mini-stories<sup>1</sup>, which support the transformation of people technology and work meta-narrative that emerged from the grounded analysis, and also illustrate how participants are dealing with technology in everyday life. These stories also support Kakihara & Sørensen's [1] theoretical implications of mobility in the context of the "interaction that people perform" and their three interrelated dimensions of mobile-human interaction: spatial, temporal, and contextual.

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<sup>1</sup> Stories are highly condensed to capture the essence of how technology transforms the way the participants work and how technology transforms the participants and their relationship to work.

## 4.4. Technology and the Entrepreneur

In this sub-theme we highlight two cases where technology enabled entrepreneurially-minded individuals to pursue work and life goals. The individuals were able to manage technology in a way that allowed them access to information and knowledge and communicate with colleagues and clients across time and space.

### 4.4.1. An inventor takes on the world

Participant A, an inventor of a technology solution, started a company to market his invention worldwide. An overriding concern for the young company was to avoid costs. An internet website created a global presence.

The whole internet basically added to the exposure. People found out about it that way. We never advertised, people just contacted us. They'd send us an email and then we'd follow-up and send them some stuff and then we would go and give them a call.

Most international communication was done through Skype. Skype allowed low-cost calls, conference calls, and became the basis of an extensive contact list. Skype's online notification feature fostered instantaneous global communications. As the company grew, the participant realised that he was becoming the primary repository of critical organizational sales and marketing knowledge. This knowledge was in his head and it was becoming harder and harder for him to communicate this knowledge to other sales people. It was a communications and information bottleneck. He turned to Salesforce, an online CRM program. Salesforce allowed for the creation of customer-based call reports, purchase orders, contracts, etc. in a centralised online repository. The participant summarizes his perspective on how technology transformed his opportunities to succeed:

[This technology] in the past was only the domain of huge organizations. It's huge money and complexity. And now it's available cheaply at a really great standard. I would say it's a revolutionary change. You just couldn't do it before. I don't know how you would have done it.

In essence, the knowledge in the participant's head, as well as his employee's, could now be placed online and made available to everyone. This freed him up to take on more critical managerial responsibilities in the growing company.

... what else is really powerful is it took the knowledge out of my head. One of the biggest problems the organization had... I would know something that other people wouldn't and ... in the end I got more stressed, it was harder for me to communicate stuff and that was the biggest

issue that we had. ...It forced me to get more logical. ... Initially I was the person that populated it and then other people took it up.

#### **4.4.2. An entrepreneur uses technology to achieve a desired lifestyle**

Early on, participant B saw how technology could allow him to work flexibly doing things he enjoyed, avoiding the 9 to 5 office routine, and spending more time with his young family. After completing his degree and with the advent of the Internet, he started a dive business. He built his own website, marketed through e-mail lists, and set up a webcam from his house overlooking the beach to allow potential divers to see the state of the waves.

He used his cellphone in a number of ways: to receive bookings from clients, but also since he ran his boat near the coast, he was also able to take bookings while on the water: he simply picked up clients at any convenient beach.

Everyone wants to go as soon as the sun comes out. And most of the time they wouldn't give you any notice, and ... the weather pattern is so unpredictable you couldn't really plan when there was going to be a good day, even a week in advance. ... I had to be contactable at all times ... if someone rang me five minutes "I'm just up the road ... if I come now can I get on this trip?" then the profit margin was noticeably better.

The cellphone was also his primary safety device, as he found a much more reliable device than a marine radio. Cellular technology transformed the business in many ways.

Sometimes I'd be out; I'd just end up being in the boat all day. Also I used to run two coasts<sup>2</sup>. So sometimes I'd start on one coast and then I'd end up 100 miles round the coast up, further up and so I could ring someone to bring the trailer. I didn't know from day to day - the weather changed so much in Wellington even from morning to afternoon. Sometimes I couldn't get back in where I'd launched from, I'd have to ring someone to come and tow the trailer back to another, a safer, a safer pull out point.

#### **4.5. Technology as the Foundation of Work and Life**

In this sub-theme we look at three cases, which highlight the ubiquitous nature and potential of technology to transform work and non-work relationships and the importance of context in how, when and where work is done. For one participant the

technology can barely be separated from any aspect of his life. It makes his livelihood possible but he is aware of its overwhelming presence. In the second case, the participant has adopted technology to suit her needs and to enhance her life. In the third case, the participant is very much focused on how the technology is, in some ways, an oppressive force in his life.

##### **4.5.1. Technology as empowerment**

After completing a Masters' degree in Computer Science, participant C followed a career in the support of the technological infrastructure in multinational corporate organizations. His single lifestyle probably allows his present role, which requires his personal 24/7 availability to an international constituency of clients and peers. The technology he uses enables constant availability to him at work, home and all points in between. Although he has an active social and sporting life, he is never far from the technology that connects him to his globally distributed working environment, even to the extent that he carries his cellular phone in a waterproof bag while kayaking.

I went kayaking probably about two or three months ago, rolled the boat, my dry bag leaked and I drowned my cellphone and when the insurance company said to me "well what were you doing with the cellphone in the middle of the ocean?" I politely pointed out that work required me to have a 30 minute turnaround on response times and I was going kayaking for four hours.

He has also transformed his home into a hub for the seamless integration of a variety of entertainment and social communication technologies, but as his story discloses, he has an ambivalent attitude towards the technology at home, wanting it only for its transformational capabilities, rather than for its own sake. In sum, his involvement with technology is such that the distinction between business and private life has become unclear.

My laptop has turned from a Swiss Army knife into my personal assistant. So that's work. Home and work for me always tend to blur a little bit particularly because I'm on 24/7 call. It becomes dangerously easy with the way that I use technology to never stop working and I've found that I've had to check myself on that because I have the tools and the facilities and I'm dealing with people in different time zones I have to consciously say to myself I'm not going to work all day.

##### **4.5.2. Enhancing the potential of work and life**

Participant D has made use of technology in many facets of her life. She lives in two cities, with a home in Auckland where her husband lives, and a home in

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<sup>2</sup> The Southern coast of Wellington provides easy access to the Pacific Ocean in the East or the Tasman Sea in the West.

Wellington where she works at a government department. Technology is an enabler for her, allowing her to schedule both her personal and work life in both cities.

[Technology] makes sure that I don't forget things, which is easy to do when you live in two houses. I always have at hand some form of technology that enables me to get in touch with people that I need to get in touch with. Either a cellphone or a laptop that I have internet capability on and I can do things like internet banking at 10 o'clock at night if I need to and I can order flowers to be delivered to my parents because it's their wedding anniversary.

When working remotely, she does not in any way feel separated from her colleagues or work. Her laptop has been set up by the organization to work remotely and she is permitted to work from home in Auckland when she needs to be there and because there is a very good secure network environment she has the ability to access her files via a high speed Internet connection.

She keeps in touch with team members via phone and email and voice mail. When travelling between home and work, she is able to work at airports and on the plane.

Participant E is studying for her Masters degree at a university in Wellington. The program she attends caters to both local and distance students via an online system. This technology enables her to view files as well voice and text conversations and to synchronously 'attend' classes wherever she is, even when travelling overseas.

I could still actually call in to the lectures from wherever I was, and to me that was really important because it was a critical period that I was away. I couldn't afford to miss any of those lectures. And the software that they were using at the time ... enables you to actually view files as well as the voice and chat conversations.

She also maintains relations with overseas family members via email, phone over IP, webcams, and digital photos. Finally, as a crafts person she is able to expand the scope of her hobby, making patchwork quilts, by networking with other quilters and locating source material on the internet.

So for me technology is an enabler, it enables me to schedule my life using various facilities both at home and at work ... so I don't feel that the distance that I am from what it is that I need to be doing is hindered in any way.

#### 4.5.3. Technology as oppressor

Another person in a global technological support role is Participant F. A young family man who cheerfully classifies his wife and himself as "geeks"

is the sole designated support for a complex software product used in various time zones around the world.

My occupation is that I'm a client services manager for a software company. I've got a piece of software that I look after and I am the technical subject matter expert on that piece of software as well. So I'm kind of technical client services ... which involves me basically sitting behind my desk at a computer pretty much all day answering emails predominantly also constructing kind of scenarios and duplicating setups in which clients are experiencing problems, that kind of thing.

Consequently, he has broadband-connected technology at home on which he is often required to provide assistance to customers in need of help. He finds that he has over developed his sense of loyalty and helpfulness to his clients, so much so that even when he is at home reading personal email, that he feels compelled to check his work email and if a client has a problem he may spend hours in the evening working to solve it. For him technology is a two-edged sword – allowing him the convenience of working from home but drawing him into work when he would rather not.

## 5. Conclusions and Implications

At the beginning of this article we raised the question: what effects are personal productivity technologies having on individuals in their work and non-work lives? Based on our (limited) data, we can conclude that these technologies are having a transformative effect on how people work and live. Our participants have not waited passively for technology to enter their lives. Rather, they have willingly embraced it, deliberately seeking positive transformation in their lives at work and at home. Even with such ordinary technologies as laptops, wireless connectivity, and cellular phones, they have each transformed their private and professional lives so as to get more out of both. Mobile technology in particular has enabled the participants to live and work in ways that were previously not possible.

The participants' stories support Kakihara & Sørensen's [1] conceptualization of the three interrelated dimensions of mobile-human interaction: spatial, temporal, and contextual. Clearly the use of technology has allowed participant to work anytime and anyplace. Moreover, how the participants' choose to work in any given situation is highly contextual-based depending on what needs to be done, who needs to be consulted and what technology is available Participant F, for example finds himself drawn into work situations while at home:

I'm sitting at home on my computer say in the evening, ... and I see something major which has come into my [work] inbox and it begins to



elevate my stress level and so I sometimes find it a little bit difficult to switch off from that and say no you're not in the office now.

It appears that with the advent of mobile technologies, space, time context, and people are indeed being transformed – but not always for the better. It is abundantly clear that technology is a two-edge sword. While it has the potential to enhance and even transform work and non-work interactions, it can also result in an unrelenting assault on one's time and space, creating expectations of always being "on" that can ultimately have a debilitating effect on individuals and their families. This was the case with participant F and his unrelenting, and seemingly unquestioned, loyalty to 'his' clients to the point where he will work hours during the night on his time and without compensation.

Indeed, what we may be seeing, to paraphrase Kakihara & Sørensen, is technology promoting complex patterns of interaction within people, an intrapersonal interaction that calls out for further investigation.

### 5.1. Research and Practitioner Applications

This research was deliberately exploratory in nature. We chose not to structure data collection and analysis through a theoretical lens that could have limited what we as researchers would see from our data. Rather we decided to allow our participants to tell the stories about their interaction with technology that mattered to them. From these stories, using inductive analysis, themes emerged allowing us to see that technology was having a transformative effect on users in both work and other aspects of life. However, as we have shown there is value in looking at this data through an appropriate theoretical lens such as the one Kakihara & Sørensen [1] provide with their conceptualization of mobile-human interaction. It might be very valuable to compile more stories and analyse them through this lens

The methodology used in this study and the resultant data also indicates that practitioners (technology users) can find value in being more reflective about the use and effects of technology. From their experiences as early adopters, our participants have learned lessons that less experienced users can benefit from. These include the need to actively and consciously manage the effects of ICT on work-non-work balance, both for better performing employees in the organisation, and for more contented family members at home. Managers and organisations also need to be cognisant of the effects, both positive and negative, on employees in work and family roles and respond appropriately.

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