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Digital Engagement: Personality Is The Context Of The Text

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Introduction

In the western world the digital networked environment is generally understood to be an extension of the physical environment or as being mostly analogous to the physical environment. However there are clearly differences as evidenced by the unbounded document, which is fragmented and de-sequenced information in digital form. The unbounded document is a product of the digital network paradigm and presents unprecedented opportunities and challenges to both custodians and seekers of information. Nearly a century ago Franz Kafka aptly described the challenge facing contemporary society when he explained his own creative process.

> "Those things which occur to me, occur to me not from the root up but rather only from somewhere about their middle. … it begins to grow only from the middle." (Brod, 1948, p. 12)

With the ubiquitous embedding of digital networked technology in society and the emergence of the unbounded document, humans increasingly obtain information in a Kafkian way. We grasp at snippets of decontextualized text sourced for us by non-human entities such as search algorithms and software that manage the storage of data from multiple globally dispersed databases, which strip the physical worlds' contextual framework, and in a Kafkian way we have to build from the middle to make sense of the information snippets. Is this good? Possibly. Humans can now access a wide range of specific data rapidly and with great ease. Is it bad? Potentially. While appearing relevant, the snippets of data may be sequentially or contextually misleading. The unbounded document is not only fragmented, it is fluid and does not have the static permanence of traditional documentation. Can we collectively optimize the good and minimize the bad? I believe that we can by understanding the innate nature of digital technologies and how digital-engagement has the capacity to amplify, diminish or over-ride individuals personality behaviours that make digital-engagement difficult to manage and control. And digital-engagement is likely to affect our capacity to source and evaluate information, which in turn affects us.

To explain this I begin by addressing the perception of digital networked technology as being a tool. I then discuss digital networked technology as an environment and how it differs to the physical environment because how we perceive an environment will affect our behaviours whether we are aware of it or not. I then outline my research methodology and preliminary results. This is followed by a discussion on some of my preliminary findings and how digital-engagement impacts on the individual.

Background

I view digital networked technology as being the hardware that is made up of the devices that interface with a network (routers, computers, mobile phones, ipads, Wi-Fi devices etc.) and the networks which connect the devices (high speed backbones, typically fibre optic trunk line, and more recently radio bandwidth in the case of wireless networks as well as the software used on these systems. Digital networked technology is a complex evolving system

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that is both a proactive tool and an environment as the following discussion shows.

Digital networked technologies as a Tool

Recently, there has been a significant increase in tool-use related research particularly in the field of robotics, cognitive science and artificial intelligence as researchers explore and develop 'stimuli-response machines' (Arsenio & Fitzpatrick, 2003; Bahrami, Yuan, Smart, & Shadbolt, 2007; Clark, 2003, 2011; Harvey, Collman, Dombeck, & Tank, 2009; Rupert, 2009). Previously tool-use research tended to focus on differentiating humans from other species by examining cognitive mechanisms. Other primates use, make and even solve sophisticated problems with tools but they have limitations (Povinelli, 2003; Wolfgang, 2001). Primates for example have difficulty with "abstract causal variables that govern objects and their relationships in the physical world" (Johnson-Frey, 2003). Humans however develop an understanding of causal relationship in early infancy. They use tools not only for implementing sensorimotor transformations [i] but also for abstract perceptual reasoning [ii] (Spelke, Breinlinger, Macomber, & Jacobson, 1992). Infant tool-use development was viewed ecologically as a complex process involving the human, the object/tool and the environment (Conally & Dalgleish, 1989, p. 911; Leeuwen, Smitsman, & Leeuwen, 1994; Newell, Scully, McDonald, & Baillargeon, 1989, p. 829).

An ecological approach for examining digital tool-use seems appropriate because it considers the fluid relations and interactions between an organism, the environment in which they are found and the organisms' relationship to other organisms (Gibson, 1979). Mathew Fuller added that it was also necessary to consider "the synthesis of both the elements and its result" and Claire Michaels included time as a necessary consideration (Fuller, 2005, p. 2; Michaels, 1981). Before proceeding, it would be prudent to establish if digital networked technology can indeed be regarded as a tool.

The definition of tool-use varies between and within disciplines for example:

Discipline	Definition	Reference
Cognitive neuroscience	Tools are manipulable objects used to transform the users' ability, into repeatable actions, in order to achieve a specific outcome. "(i.e. motor-to-mechanical transformations)"	(Frey, 2007, p. 368)
Computer Science	Propose a similar view but accentuate the externality of the tool saying that the transformation can be either an altering of the physical properties or it may include abstract properties such as the flow of information.	(St. Amant & Horton, 2008, p. 1203)
Ergonomics	Agree that tool-use involves manipulable objects used to alter the environment to achieve a goal but ads that tool-use also "represent an extension of the users themselves".	(Baber, 2003, p. 8)
Primatology	Tool-use is "the use of an external object as a functional extension of mouth or beak, hand or claw, in the attainment of an immediate goal."	(van Lawick-Goodall, 1970, p.

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The common properties of tool-use appear to be the use of manipulable objects to alter the environment in order to achieve a goal. When considering digital networks as a tool, these properties hold. Digital networks are manipulable via software code, programs and applications, or in the case of hardware through processors and routers. Digital networked technology has profoundly altered the environment in which humans function, from the way humans socialize and work to the way humans' source, consume and share information and resources. It appears then that digital networked technology can be treated as a tool.

However, St Amant and Hortons' "externality" of tools pose a problem: Consider Deep Brain Stimulation (DBS) (Donald A. Malone Jr. et al., 2009; Greenberg et al., 2006). DBS uses electrodes implanted directly into the human brain. Therefore they cannot strictly be considered an external tool. On the other hand DBS presents a problem for Gibson's tool definition, which he says, should be graspable and transportable (Gibson, 1979, p. 41). When in use, the DBS electrode is not graspable in the traditional sense, but then neither is an APP or a Blog and yet these examples do conform to the initial three common properties of tool-use. Gibson also states that when in use a tool, becomes "a part of the user's own body, and thus is no longer a part of the environment of the user. But when not in use, the tool is simply a detached object of the environment" (Gibson, 1979, p. 41). In this regard Gibson's definition does apply to a DBS electrode, which is totally enmeshed when in use, but becomes a piece of wire when not in use.

Considering the smartphone as a tool provides some interesting insights. Initially the smartphone is regarded as simply a device but depending on the users' level of engagement with the device, the smartphone becomes more than a passive tool. It stores, accesses information and actively engages with the user via reminders and personalized ringtones. As a result the device acts as an extension of the users' memory and cognitive processing. The user also develops an emotional relationship to the device as seen in the following extract from my research where the device has clearly become more than a simple tool.

> Ann - i1q1: "I cannot move without my phone. My phone is an extension of my hand. … if I haven't got my phone I am no more. I don't exist without my phone. … How can you do without your phone?"

A.W. Smitsman also notes that tool use is a means of conveying insights between generations and humans of different skill levels (Smitsman, 1997). Tools not only impact on our immediate physical world but they also have the capacity to change a human's capability-perception as well as the capability of others: They have the potential to act as a medium for the transmission of ideas and concepts. For example the progression of primitive mans' use of a flat stone for digging to current earth moving equipment. In both this example and the evolution of digital networks we see that humans and elements of the digital network evolve in tandem over time (Spencer-Scarr, 2014).

From this discussion it appears that digital networked technology can be classified as a tool but it also appears to be more than a tool because digital networks engage with the human at a practical, emotional and cognitive level. However, digital networked technology can also be considered an environment in which humans operate.

Digital Networks: A Duality of Environments

The physical environment is the one in which humans have evolved over millennia passing on societal information and personal experiences to other humans and following generations. As a result of evolutionary experience in the physical environment humans have developed a general understanding of concepts such as time, space, memory, locus of self and value exchange that have aided their survival and prosperity.

The digital networked environment on the other hand is a recently created environment in which humans increasingly function due to the ubiquitous embedding of digital technology in society. There is extensive research into the seamless enmeshing of both environments ranging from user interface to improving human functionality. (Bavelier, Green, & Dye, 2010; Gallagher et al., 2013) There is also extensive research into social behaviours and many aspects of education. (Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014; Selwyn, 2011; Turkle, 1995; S.-L. Wang & Lin, 2007; S. Wang & Tamada, 2010) Generally speaking, research focus has been on the cohesion of the two environments and the seamless integration and adoption of the digital environment into the existing framework of the physical environment.

There are however those who view the two environments as being somewhat different. (For example Castells, 2010; Deleuze & Guattari, 1987; Heidegger, 1977; Lyotard, 1984; Mayer-Schönberger, 2009) The following is not a definitive argument; it is simply a brief discussion that explores a few first principle concepts within the digital networked environment to establish if humans experience them differently to the physical environment.

Time

The Western concept of time is generally understood as being linear: It is a dimension marked by change. ("The Oxford Companion to Philosophy," 1995) It is the metronome of individuals and societies: '[w]ithout clocks and the precise timing of activities,… industrialized societies could not exist" (Lewis Mumford as quoted by Giddens, 2006). On the other hand Manuel Castells describes time in the digital environment as being timeless time (Castells, 2000, p. 13). He explains the '[e]limination of sequencing creates undifferentiated time which is tantamount to eternity' (Castells, 2010, p. 494) In the digital environment, users experience of time is *both* instantaneous and eternal: Instantaneous time is experienced in global financial markets where geographically dispersed humans interact in 'real-time'. The perception of time in these circumstances has been compressed taking on the appearance of instantaneity. Heidegger's discourse on standing-reserve could be applied to user's perception of time in the digital environment, which is expected "… to be immediately at hand, indeed to stand there just so that it may be called for" (Heidegger, 1977, p. 17).

The concept of 'eternal time' on the other hand is the result of the operational behaviours of the digital network environment where information

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is identically copied, shared, stored and archived by humans, hardware and software in multiple places on the network without the initiators knowledge or awareness. This makes information potentially exist for eternity. It is a process exacerbated by lack of diligence related to the evaluation of information before storage.

Geoffrey West proposes that human perception of time has changed. He believes it accelerates as a result of "the collective that we have constructed by coming together and interacting" through and with networked technologies. "The clock that we [now] actually work by, … is getting faster and faster" (West, 2015). West suggests that our unbounded growth requires accelerating cycles of innovation to avoid collapse. Time is no longer bound to biological or celestial entities but rather to the evolutionary innovation of technology.

From this discussion the concept of time does indeed appear to be different within the digital environment, it is no longer linear but rather it is fragmented, de-sequenced, eternal, instant and bound to technology rather than biology.

Memory

Viktor Mayer-Schönberger reminds us that traditional memory naturally fades over time but "digital remembering negates [traditional] time" by retaining exact vivid memories (Mayer-Schönberger, 2009, p. 113). Digital memory not only has the potential to affect individuals' memory, it has an unprecedented potential to effect social memory. Guy Pessach argues "the transformation from tangible or analog preservation to digitized cultural retrieval tends to result in partial and gradual privatization of society's memory institutions" (Pessach, 2008, p. 73). This offers both the utopian view of decentralized and democratized memory institutions and social remembering practices and on the other hand it offers privatization of memory institutions that may compromise a democratic vision of social remembering due to memory institution biases, which may be human or non-human, or the motives of commercial enterprise.

In addition to this the combination of digitized information, ease of authoring and cognitive surplus (Shirky, 2010) has the potential to fragment, decontextualize or trivialize societal memory. For example the subtitled parodies of Adolf Hitler's last days in the Berlin bunker, as depicted in the 2004 film 'Downfall' (Boutin, 2010; Rohrer, 2010). Although these memes are harmless they exacerbate the fragmentation and decontextualizing of information within the digital environment thus altering social memory.

Regardless of whether one takes a positive or negative view of the impact of digitization on memory there does appear to be a case for digital-memory being different to traditional memory. This is critical because memory has a significant impact on decision-making, which plays a key role in the evaluation and validation of all incoming information.

Space

In the physical environment one can passively occupy space and there is some physical resistance in moving from one space to another. Space in the digital environment is ephemeral and described by Manuel Castells as a 'space of flows', a space which he says provides the "possibility of organizing the simultaneity of social practices without geographical contiguity" (Castells,

2000, p. 14). Felix Stalder expands on this saying "it refers to a specific social condition, rather than nature in general." It "is that stage of human action whose dimensions are created by dynamic movement, rather than by static location" (Stalder, 2002, p. 1).

This 'space of flows' being a series of non-hierarchical connected nodes, can be described as a rhizomic system. Gilles Deleuze explains:

> "[T]he rhizome connects any point to any other point, … it brings into play very different regimes … It is composed not of units but of dimensions, or rather directions in motion. It has neither beginning nor end, but always a middle (milieu) from which it grows". (Deleuze & Guattari, 1987, p. 21)

It is a system of middles containing nodes that will prosper and grow proportional to their network contribution and it has no central power. A node gains and retains 'power' proportional to its ability to perform useful and reliable functions for the network. Passivity or inactivity results in redundancy. In a rhizomic system it is necessary that the node be connected to the system because from the network perspective if a node is not connected then it does not exist. Michel Callon and John Law point out that within the digital environment "there is no difference between the person and the network of entities on which it acts. Or between the person and the network of entities which acts through the person. Network and person: they are co-extensive" (Callon & Law, 1997, p. 169). Unlike physical environment space, which can be statically occupied, space in the digital environment is created and retained only by action and relationships: be they human or non-human actions. This concept of space is certainly different to the traditional concepts of space, which can be passively occupied.

The Locus of Self

The concept 'locus of self' relates to where we perceive our self to be in relation to our environment. This is best explained using Martin Heidegger's concept of dasein (being) (Heidegger, 1962). Heidegger suggests all being takes place in time, and the individual should extract and experience what is relevant to them for the duration of that time because what is now will inevitably change. Time for Heidegger is however seen as being linear. Dasien's contingency on (liner) time now becomes problematic in the digital environment because if instead of using sequential time we apply Castells concept of 'timeless time' we find a conceptually 'new way of 'being' in a de-sequenced, instantaneous and eternal state. In the digital environment humans now have the ability to be 'present', albeit virtually, in a geographically boundless landscape in 'near instant' time for eternity within fluid space. This is certainly a different concept 'of being' for individuals. From these few examples of first principle concepts there is indeed a compelling argument that humans are experiencing first principle concepts differently within each environment, which is likely to affect their behaviours whether they are aware of it or not.

My research was to develop an understanding of digital-engagement within the broad framework of society and to come to some understanding of why some individuals were better able to adapt to the new paradigm. To do this I examined participants' digital-engagement behaviours to establish if it

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was in some way related to personality. My research did indeed show a relationship between the two. I propose that personality is indicative of an individuals' propensity to a type of digital-engagement. Understanding the nuances of ones personality profile as well as the innate nature of the technology provides the best opportunity to appropriate technology to an advantage. The alternative carries the risk of being managed by technology as will be seen in the case of Sam below.

Research Methodology

A grounded theory approach was used for data collection, which employed mixed methods (Bryman, 2008, pp. 538-689). This involved three video recorded interviews of sixteen participants. At the start of the research there was a self-reported survey for personality and demographic data (Goldberg et al., 2006). This involved the standard NOE-PR-I personality tests, which evaluated participants' personality traits Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism as well as the associated subscales of these traits.

Due to the lack of research regarding digital-engagement, the grounded theory approach was used to extract information in an unknown area. This involved a series of three in-depth interviews for every participant and each interview built on the previous one. Interviews were transcribed, interpreted, coded and classified in order to extrapolate a measure of the individuals' digital-engagement. The participants' digital-engagement measure was then correlated to the individuals' personality score in order to determine if personality was correlated to digital-engagement. Digital-engagement, which is not necessarily indicative of skill level, describes the iterative process that results from the enmeshing of two different entities (human and digital networked technology) that becomes a single unit with enhanced productivity.

All participants were ICT professionals with academic backgrounds ranging from year 10 to post graduate. The gender spread was slightly weighted to males and the age spread was 21 to 62.

Preliminary Results

Preliminary results showed there was a positive correlation between digital engagement and the personality trait Agreeableness: High Agreeableness indicate digital-engagement propensity. There was also a strong *negative* correlation to Extraversion: High Extraversion scores indicate lower digital-engagement propensity. Openness and Conscientiousness acted as strong moderators within the digital environment. High Openness scores supported digital-engagement particularly when associated with high Agreeableness where behaviours were amplified. These presented as either positive or negative depending on other digital-engagement factors such as 'motivation' and could moderate, mask or change primary digital-engagement traits as discussed below. High Conscientiousness scores tended to enhance skill-levels rather than digital-engagement. Neuroticism was not particularly significant in relation to digital-engagement and appeared equally influential in both the digital and physical environment.

Discussion

As digital networked technologies are progressively embedded in society humans increasingly experience a duality of environments where they

consciously or unconsciously have to manage conflicting first principle concepts that inevitably affects their behaviours as illustrated below.

The preliminary findings of this research showed the majority of participants are not aware of this conflict, they simply struggle with the consequences. Although all participants were ICT professionals only 6% was fully aware of the duality and 19% were partially aware: Both of these groups (total 25%) were able to utilize technology to greater personal advantage and were more capable of managing and reconciling dual environments.

A large portion of the participants (50%) displayed varying levels of stress and negative behaviours that related to the duality of environments despite being highly skilled in using digital networked technology. Thus they struggled to maintain control of their relationship with technology as demonstrated in the following interview statements.

> Max - i1q1: "I know that I don't really like them [digital networked technology] …its like the only way that I can contact people … like you can't avoid it.. … I don't know It's hard, a love hate relationship. I like it sometimes and I don't like it"

Then later in the interview he returns to his conflict:

> Max - i1q4: "So it is integrated through my phone [I'm] always on Facebook and using internet banking on my phone … That is what I don't like about it." [Interviewer: The instant banking?] "I do like it, I love it and hate it!"

The least engaged (25%) were unaware and dismissive of the idea of a duality in any form. They believed they understood, controlled and managed technology. To this group digital networked technology was simply 'the newest tool'. Their behaviours however indicated otherwise. This group were highly stressed by technology and displaying frequent examples of technology managing and controlling them.

> Ann – i3qAq: "It frustrates me because I look at a specific thing and then they hike me off to where I don't want to be hiked off to. Then they don't make it easy to get back to where you originally wanted to be *I don't like being led down the garden path!*"

One interesting anomaly was Sam who exhibited fully engaged behaviours such as extreme synthesis with his smartphone, using it to personal advantage in both work and recreation and he had a positive emotional component to his relationship with technology. However, unlike other fully engaged participants such as Fay[iii], Sam's relationships to digital technology did not extend to the wider digital network environment or to other devices. He also did not recognise any possible negative aspects of technology. His synthesis with the technology was so great that he could not perceive the possibility of a negative technology control issue. Sam's awareness of his relationship with digital technology was limited. When asked if he thought that 'one runs the risk of loosing control if they are not aware of and accept that technology changes one as it changes', he answered:

> Sam-i3q5: "Loosing control?... Maybe, I don't know …[we] become sort of accepting of these changes ... I don't know if it will take

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> control because we are accepting of it. ...its not leading us to make decisions against our will ...if that makes sense. … We consider it to be an enhancement.“

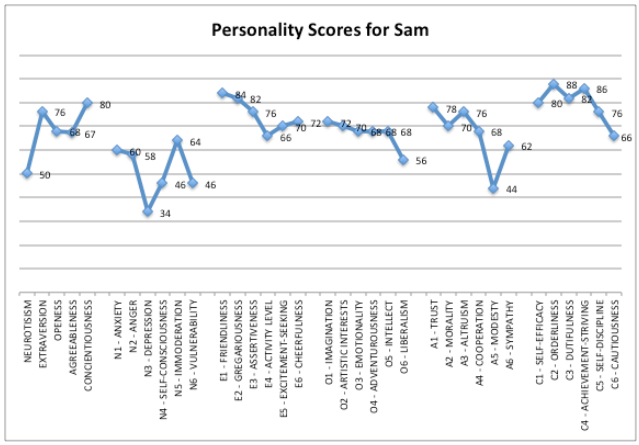
For the same question Fay, a fully engaged individual, answered the following:

> Fay-13q5: “A person that is not self aware in any regards will always run a risk because if you don't realize that you can be influenced and changed then you will never know that you are being manipulated or brainwashed or coerced. You have to take responsibility for the fact that you can be altered by external things. “

It was apparent that some participants were better able to cope with the duality of environments and the engaging influence of technology than others.

Significance

The significance of these results for individuals involved in information storage and management is that personality traits affect digital-engagement behaviours and tends to amplify certain behaviours. This is illustrated by examining Sam a male university graduate age 29, who came from middle to high-income background and had access to digital networked technology from late primary school. Sam is an individual whose personality traits are indicative of someone who is comfortably suited to the physical environment. Sam’s overall personality score (in the graph below: first group on the left) showed Extraversion as a high score (76) and Agreeableness as his lowest score (67). According to results of this research, Sam’s profile clearly indicated that he would not be digital-engaged and would have a propensity to struggle with technology managing him. Sam’s behavioural history supported this. However in the interviews some of Sam’s behaviours also presented as fully engaged but only within a very narrow scope! He was synthesized with his smartphone and social media: Specifically Facebook. Sam was introduced to Facebook in his late teens but he did not engage with it in any significant way until he acquired his Apple iPhone in 2007.



To understand why Sam became fully engaged, all be it in a narrow range of technology, it is necessary to examine the powerful moderating influence of subscales on Sam’s high Extraversion score. Sam’s highest

subscale scores were achievement striving, self-efficacy, orderliness and dutifulness. These belong to the Conscientiousness trait (in the graph above: first group on the right).

The mobility and ease of use of the iPhone appealed to Sam's Extraversion subscale traits: Friendliness (84) and Gregariousness (82). Sam could now easily organize face-to-face activities through his iPhone and the more Sam used the iPhone the more it engaged with him. This appealed to his orderliness trait through reminders and re-enforced his predisposition to follow rules: If someone SMS'ed him he responded immediately which elicited further responses. This increasingly iterative interaction accelerated and intensified his engagement with the technology.

Sam was also interested in marketing and his now deeply embedded relationship with the smartphone made him a natural fit to the position of online marketing manager. The consequence of this match augmented engagement in both work and recreation resulting in an exaggerated synthesis within a narrow scope of digital networked technology. When asked if he used his laptop he dismissively answered and then immediately reverted to passionately discussing his smartphone:

> Sam-i1q3 and 9: "I'd say 5% It's you know,,, a lot of people are using mobile devices to engage with social media" a few seconds later "I check Facebook 20 plus times a day I'm always on my phone. … that accessibility its the convenience".

In the Sam example we see someone who has no innate affinity with digital technology but after the initial engagement with a device that feeds a major personality trait (Sam's Extraversion), the nature of the technology reaches out and perpetuated the engagement. This engagement was disproportionately amplified because it supported Sam's Conscientiousness subscale traits and resulted in an accelerated and intensified synthesis with the technology. Sam appeared fully engaged but his relationship with the technology was being managed by the technology. Sam had a limited depth of awareness of his capacity to manage his relationship with the technology. In the case of Sam, behaviours resulting from his digital-engagement are seen as positive and constructive because they are aligned with socially sanctioned goals but they could just as easily have been negatively viewed behaviours as in the case of gamming addiction (Bavelier et al., 2010).

Richard Wurman said: "The information we ingest shapes our personalities, contributes to the ideas we formulate, and colours our view of the world" (Wurman, 1989, p. 204). This statement sums the significance of this research. The way digital technologies engage with individuals has the capacity to amplify, diminish or over-ride innate personality traits and that digital-engagement can be intense and difficult to control. As seen in Fay's comment above, one needs to be self-aware. If not, one may be subject to being influenced and will not be aware of manipulation, brainwashing or coercion. "You have to take responsibility for the fact that you can be altered by external things." (Fay-13q5)

The weight of this responsibility is even greater for custodians of information because they not only have to be aware of their personal stresses but also the stresses of users and the technology. It is through self-awareness and awareness of the proactive nature of technology that the gatekeepers of

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information will be able to manage the process of delivering the unbounded document.

Conclusion

In conclusion I return to my original question: In relating to digital networked technology can we individually and collectively optimize the good and minimize the bad? I believe we can and the solution lies within the individual and their consciousness of the digital-engagement process. I propose that in order to manage technology to our advantage rather than be managed by it, we need to understand ourselves, our personality which is our innate map that filters all information. We must take responsibility for our relationship with technology and not simply outsource it to the technology itself as in the case of Sam. Wurman proposes that:

> "A map … is a pattern made understandable" (Wurman, 1989, p. 260).

It is essential that we understand our map, our personality, and conceptually adjust it as it adjusts to evolutionary innovation of technology. In this way we can retain the integrity of not only ourselves but also the unbounded document that in turn shapes society and scaffolds individual and social memory

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[i] Sensorimotor transformation is the process by which sensory stimuli are converted into motor commands: This process is critical for human and non-human systems that require environmental interaction.

[ii] Perceptual reasoning is the ability to learn and store new information from the environment as opposed to recall skills. It is a fluid abstract reasoning.

[iii] Both Sam and Fay are university graduates, they had private school education, are in their late twenties and are from similar socio-economic backgrounds that provided significant digital networked technology access starting in late primary school.

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