Collective Studies in Knowledge and Society

Series Editor: James H. Collier is Associate Professor of Science and Technology in Society at Virginia Tech.

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Toward Public Self-Awareness Regarding Technological Mediation

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Frank Scalambrino

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Similarly, the Other is unable to respond to me insofar as intersubjectivity requires both persons to be able to recognize the subjectivity of the Other. Thus, all sense of ethical responsibility and intersubjective recognition is made impossible through facial recognition software; all that is left is conflict and objectification, and our moral knowledge of the other is stolen away from us by the objectification and circumscription of the Other.

NOTES

1. I recognize that this claim is itself problematic and warrants its own careful investigation (presumably through the work of Foucault, who brought to our attention the dangers of the technology of surveillance in *Discipline and Punish*), but I leave this claim in its controversial status because the developer of NameTag boasts about this capability.

2. One notes that Sartre is deeply indebted to Hegel's *Phenomenology of the Spirit*, especially sections 431 and 433, wherein Hegel asserts that consciousnesses battle each other to assert themselves in the "master-slave" relationship.

Chapter 17

Situated Mediation and Technological Reflexivity

Smartphones, Extended Memory, and Limits of Cognitive Enhancement

Chris Drain and Richard Charles Strong

In 1928, Paul Valéry speculated that "like water, like gas, like electric current which are brought from far away and in to our homes, responding to our needs through almost zero effort, so we shall be served visual or auditory images which will appear and disappear at the smallest gesture" (Valéry 1960). This passage, partially incorporated into Walter Benjamin's "The Work of Art in the Age of its Technological Reproducibility," illustrates how Valéry's imagination did not go far enough (Benjamin 2006). Today the effortless command of "visual or auditory images" is not limited to passive sensory experience. Indeed, with the ubiquitous computing afforded by the smartphone, it is available for many anytime, anywhere.

In 2014, 58 percent of Americans had smartphones according to the Pew Research Center. Projections compiled by data firm Emarketer show that by 2016, 20 percent of people in the world will own a smartphone. These numbers present a slow and silent revolution in everyday ubiquitous computing. For many, smartphones have become indispensable for work and leisure, for maintaining human relationships, and even for trying to find one's "soulmate." In light of smartphone technology, there has been and continues to be a nontrivial modification of what humans are, how they act, and what they know. No small amount of ink has been spilled prognosticating what the future of humanity will entail with respect to digital technologies (Fuller 2011). However, we insist that even making sense of the present is no small task. The smartphone is not the harbinger of changes for humanity. It is the instrument, evidence, and scaffold of changes already wrought, of practices already modified, of memory and perception already altered.

Central to our project is the foregrounding of the notion of technological reflexivity. Technological reflexivity refers to the way in which technological practices have a bidirectional causal influence and on human agents. Such bidirectionality shouldn't be conceived of only in the manner of traditional propositional logic as an "if-and-only-if" between two sets of terms. In accordance with but also extending beyond the thematic concerns of the paradigms of situated cognition and actor network theory, the "directionality" in bidirectional causation can refer to higher and lower order levels of causal explanation—from institutional levels acting causally on individual actors from the "top-down," to individuals causally acting on society as a whole "from the bottom up," as well as actors affecting each other "horizontally," a process which itself alters the causal feedback of the system as a whole (Sawyer 2005).[1] Looked at from this latter horizontal aspect, technological artifacts occasion the hybridization of human and nonhuman agency, which in turn endows both the user and the device with new ranges of possible action (Malafouris 2013). Put another way, the situated potentials for action between material things in the world and the interactional processes thereby afforded need to be seen as not only constituting the possibility of agency, but thereby also comprising it. *Eo ipso*, agency must be de-fused from any local, "contained" subject and be understood as a situational property in which subjects and objects can both participate. Any technological artifact should thus be understood as a complex of agential capacities that function relative to any number of social and material factors.

Keeping in mind that we are co-constituted by webs of relations involving increasingly complex collections of artefacts, networks, niches, and communities of practice, our investigation will be guided by interrogating the functional potential of a thing that in the last fifteen years has seamlessly worked its way into the everyday life of millions of human agents. This "thing," the smartphone, is merely a nodal point in a highly complex network. Recognizing this massive "collective," we nevertheless want to show some of the ways in which something as seemingly mundane as a smartphone can reflexively alter the range of actions available to a cognitive agent (Latour 1994). Specifically, we hope to shed light on some of the social-cognitive consequences of technological mediation by looking at the complementary, if not mutually implied, domains of memory and knowledge.

I. MEMORY AND SOCIAL-ARTIFACTUAL MEDIATION

In this section, we will look at some of the impacts that smartphone use has on memory. While the case has been made that ubiquitous computing has already altered the cognitive functions of attention and short-term memory, we will be limiting our discussion to the effects of smartphone use on explicit long-term memory (Hayles 2007; Carr 2010). The relevance of smartphones with respect to semantic memory will be touched on here, but more directly addressed in the next section insofar as it relates to our everyday knowledge and beliefs. We choose episodic memory because its autobiographical, apperceptive, and temporalizing aspects relate most clearly to our larger thesis that the smartphone is a potent material agent that significantly alters the range of cognitive actions available to its user (Campbell 1997). And with respect to memory, such reflexive technology plays a vital role in the social construction of the self and collective remembering.

I.1 Situating Memory

From the perspective of situated cognition, memory is viewed not simply as a retrieval system but rather as a reconstructive process that depends on ever-changing contextual inputs. Literally *extending* connectionist and constructivist schemas that explain remembering as a process entailing the activation of superimposed neural "traces" whose distribution and potency depends on the history of the network, a *situated approach* adds that extracranial resources and processes can be just as integral to the (re)construction of memory (Sutton 2009, 219). The move from a connectionist-constructivist to a situated account does not deny that interior neuro-cognitive processes can be sufficient for acts of memory, but rather seeks to extend the model. On an internal scale, remembering is a temporally situated and contingent process of reconstructing distributed and sedimented neural traces. On an external scale, remembering is a materially extended and socially distributed process that relies on bodily and nonbodily scaffolds, artifactual assemblages, exogrammatic symbols, signs, and icons, as well as joint-attentive processes of social and dialogic cueing (Vygotsky 1997; Clark 2010b; Donald 1991; Aydin 2015; Scalambrino 2012; Hirst and Echterhoff 2012).

The functional scope of the smartphone is vast, expanding well beyond its original telephonic intention. A quick look at one's local bus stop, café, or even Tahir Square will illustrate quickly that most people use their phones for a variety of tasks: People converse through text, take and share photos, record video, update social media, etc. A common aspect of these actions is that they all include a recording or documenting element. We record with smartphones and communicate those recordings. The phone can thus be looked at with respect to memory as a prosthetic corrective to the deficiencies of bare intracranial memory, one that literally extends our cognitive capacities.[2] It would be a mistake, though, to view such a corrective as issuing from its functional durability. It is possible that hard plastic, liquid crystal, and microchips outmatch the durability of neuronal gray matter. But as anyone who has lost their device to an accidental drop can attest, a smartphone can be rendered dysfunctional or un-functioning in an instant.

With the advent of cloud storage, however, such dysfunctionality is only a temporary misfortune. Such information is never really lost so long as one makes her monthly payments.

I. 2 Memory and Reflexive Mediation

The smartphone functions as a reflexively mediating device in the following senses:

1. It *becomes incorporated* within the assemblage of bodily appendages, environmental features, and artifacts that we encounter in everyday life, to the point where the phone can be considered as a prosthetic extension of ourselves.[3]
2. It *incorporates us* within a socially mediated system of symbols, ideas, and information broadly construed.

The ramifications of such cognitive coupling for how we remember can be looked at from three levels: first, with respect to the individual's own relation to her memories; second, with respect to social forces that bear on such memory making; and third, with respect to how we collectively remember. It is important to keep in mind that while these levels are heuristically isolatable, they function in tandem, each reciprocally affecting the other.

The smartphone directly affects how we construct our own personal narratives and self-identities in that it allows for the constant volunteering of information (e.g., texted thoughts, images), information which may be accessed at another time in almost instant fashion without the risk of organic or natural deterioration. In other words, the smartphone virtually radicalizes the causal directionality of externalized memory. In terms of the causal direction of agent-to-memory, the smartphone makes two great strides. One, not only does it make available a potentially unlimited (or at least a potentially unimaginable) amount of "storage" in which externalized information may be deposited, but because of its digital reproducibility such storage safeguards this information from natural "forgetting" in a way unrealizable before the advent of cloud technology. Two, the portability of, and in most cases, the perpetual online connectivity of, the smartphone render the pragmatics of such memetic exteriorization transparent as they do ubiquitous. This works just as well from the top-down. With respect to the causal direction of memory-to-agent, the smartphone enhances the recall potential of such stored information for the same reasons. How one extends her memory and how that memory is reconstructed is thus deeply altered with smartphone use.

The smartphone's function of person-to-person communication also can alter memory construction. The fact that memory creation can depend on

social and joint-attentive processes is a touchstone of the situated paradigm (Sutton et al. 2010). Broadly, the idea is that dialogic cueing not only aides memory recall but can actually comprise it. For example, a husband and wife can reconstruct past events through shared conversation—neither can independently recall a past event but through shared conversation they are able to do so (Hirst and Echterhoff 2008). In such a case the husband and wife exist as a joint agent with respect to memory construction. Adding a smartphone to the mix only enhances this agential capacity. Surely adding smartphones to a standard conversational routine enhances the recall capacity of the joint-agent in question. But if we consider that many relationships are first created and then maintained through smartphone use (e.g., through access to social media), then the possibilities for memory construction are expanded exponentially. Instead of human-human agential hybrids we have human-smartphone-human assemblages, with each constituting element reciprocally affecting the other in memory construction and recall. It is at this level of analysis where interpersonal and joint-attentive approaches to memory blur into the general social construction of memory.

There is considerable philosophical debate as to how an epistemic or cognitive status can be predicated of a group or collective, and a proper treatment of the nuances of collective memory is unfortunately beyond the scope of this chapter (List and Pettit 2011; Tuomela 2005; Searle 1995). But whether a plural subject of memory is thought of as the aggregate sum of individuals or as an emergent entity in its own right, we take it as uncontroversial that smartphone technology shows to be a vital component of how and what we collectively remember (Theiner and O'Connor 2010). Given that any event can at any time be recorded and shared by and for a multitude of agents, what and when we remember has drastically changed. For example, the Ferguson protests, the events of the Arab Spring, and the tragic events of 9/11 were documented and shared in real time by a variety of sources, each contributing to our shared histories, images, and narratives. Whereas traditional channels of journalism acted as gatekeepers, framers, and fact-checkers of such information, such editorial mediation is bypassed through the tandem use of smartphones and of social media sites such as Youtube, Facebook, and Reddit. Indeed with the smartphone in hand, a "go-to" protest chant has become, not infelicitously, "the whole world is watching." This is not much of an exaggeration given that any recording can become publicly available in a matter of seconds.[4]

II. "SMART"PHONES AND EVERYDAY MODES OF KNOWING

In keeping with our proposed framework, we'll consider what and how an agent coupled with a smartphone can know and indeed also how such

knowledge may in some cases be enhanced, diminished, and otherwise altered. The scope of our analysis will be limited to a few of the more common ways in which everyday human knowledge and smartphones are reflexively related.

II.1 Enhancements in Everyday Knowledge

We routinely use smartphones for acts of identification, navigation, reference, corroboration, and computation. Given that a smartphone can access knowledge with fine granularity in mere seconds wherever one happens to be, such an enhancement marks a radical turning point in the range of such aforementioned "acts of knowledge." The sheer speed of access and the amount of facts, maps, figures, statistics, and probabilities doesn't simply produce a quantitative shift in our potential for knowledge—enough quantitative alteration in this case constitutes a qualitative change in who, what, and how we know, as well as where we can skillfully go. The everyday character and ubiquity of the smartphone tends to cover over the radicality of this technological alteration to our cognitive and agential potential.

The human-smartphone hybrid diverges greatly from merely biological ways of knowing and encountering spaces and places. Take the example of smartphone map applications.[5] Limiting our analysis to the user-end experience, one can see that these maps obviate the need to acquire expert spatial-cultural command of a place. We know that expert knowledge of a city correlates to physical changes in the hippocampal gray matter (Maguire et al. 2006). With map applications, however, such biologically grounded skills are largely transferred to the smartphone. This lightening of the cognitive load brings with it both advantages and disadvantages.

The advantages are obvious to anyone who's used a smartphone to get around in a new city: a complex and novel environment becomes easily navigable with recourse to a map application. Such applications allow one to switch between multiple layers of navigational information from different and sometimes competing sources, improving drastically upon precellular modes of skillful navigation in unfamiliar places. If you take away the phone, then overall navigational competency drops significantly. However, such enhancement may have a deleterious effect on the experience of space and place in that any robust sense of specificity is dissolved and leveled over.[6] Despite the ability to toggle between a nominally diverse offering of information, such maps are largely the same for all users in that they tend to circumvent the social and individual thickness of meanings afforded to an embodied, phoneless, social agent. Smartphone users are also less likely to converse with or ask directions from those around them. This makes possibly serendipitous or friendly face-to-face social interactions less likely, a prime example of what Sherry Turkle calls being "alone together" (Turkle 2012).

II.2 Unintended Consequences for Learning and Knowing

Smartphone use brings with it unintended and inconspicuous challenges to how and what one knows. In college classrooms, for example, many students constantly use their smartphones for personal communication and entertainment in a way that seriously disrupts their ability to learn and to retain lessons (Smith 2011). This is perhaps in part due to generational changes in synaptogenesis that favor multitasking and diminish the ability to focus one's attention in a sustained manner (Hayles 2007). Lessons often aim at inculcating dispositional intellectual skills. This is not the sort of *processual* knowledge that can easily be accessed and assimilated via a smartphone. Nobody can tweet their way to advanced literacy, ask Siri how to think critically, or use a smartphone to grant complex, skill-dependent thinking, speaking, and interacting. In turn, this may chip away at some of the intellectual skills and *savoir-faire* that are necessary conditions for human flourishing in a democracy (Plato 1997c; Dewey 1997; Nussbaum 1997). Though these trends may be in step with other changes in our built environment, which encourage distraction and discourage deep attention, this is unfortunately one way in which the epistemologically "enhancing" capacity of smartphones undermines the gains that it grants (Strong 2014). However, it is important to note that the mediating role of the smartphone in educational settings is not as one-dimensional as it may seem. It is possible to imagine a scenario, for instance, in which a student learns more by watching Michael Sandel's famous lectures on justice from a smartphone than a student who was there in person but was distracted by her own smartphone.

Being aware of and not overstepping one's epistemological limits has been a perennial theme in philosophy since at least Socrates, and such a problem is not lost on the smartphone user (Plato 1997a). That is, recent experimental findings in psychology suggest "that searching the Internet for explanatory knowledge creates an illusion whereby people mistake access to information for their own personal understanding of the information" (Fisher et al. 2015). Thus using smartphones to access information contributes to the overestimation of "internal" knowledge and understanding of information. This case is interesting in that even in its absence the smartphone can have an effect on its user. Even when a phone is not at hand, the mere fact of being accustomed to its use renders an agent overconfident in estimating her own epistemological limits (Ward 2013).

III. CONCLUSION

The ubiquitous computing engendered by smartphone use has indeed already wrought major changes to how we act as social, cognitive agents. In the

first part of this chapter, we argued that in keeping with the thematic of situated cognition, the smartphone allows for memory to be extended and distributed in a manner hitherto unimaginable. The content and means of identity creation becomes radicalized when considered from the perspective of a hybrid artifactual agent. Such a shift consists in the reciprocal nature of memorialization insofar as such a process is grounded on the constant access to and creation of documents, whether imagistic or textual in nature. With a smartphone an agent's personal memory is augmented and enhanced, and insofar as that agent is merely one part of an assemblage of likewise enhanced agents, interpersonal and collective modes of memory are similarly altered in their potential for self and social identity construction. In the second part, we addressed how, when considered epistemologically, the "enhancements" and modifications that follow from such hybrid agents are uneven and problematic. We showed that although perpetual access to information alters what and how the average human agent knows, it does so *not* in a purely progressive or enlightened way. The smartphone alters those who use it by diminishing their attention in formal learning settings and by producing agents who tend to overestimate their own "internal" knowledge. In sum, we hope that this modest contribution adds to the larger picture of how humanity is not a pre-given notion and that alterations to seemingly fixed human capacities such as knowing and remembering are intimately bound up with and altered by technological practices.

NOTES

1. We realize the analytical dangers involved in grouping such diverse theoretical paradigms. But we hope to appeal to a certain commonality between the situated paradigm in cognitive science, emergentism in the philosophy of social science, and Latour's actor network theory (ANT). All three paradigms avoid traditional binaries setting inner against outer and subjective against objective. Sawyer's theory of social emergence adds to ANT and situated theories of cognition the idea that actions, whether social or cognitive, are subject to constraints and/or causal forces at a variety of ontological levels each with its own relative state of stability and each in a relation of reciprocal causality and/or constraint with the rest (Sawyer 2005, 189–220). Such a theoretical blending, we hope, enriches rather than confuses our discussion.

2. We are not advocating that this is always a good thing. From Nietzsche to Charlie Brooker, many have pointed out the negative consequences of *not* being able to forget (Nietzsche 1980; *Black Mirror* 2011). Contemporary legal arguments over the "right to be forgotten" illustrate that this is ever more a concern in the age of digital media (Rosen 2012).

3. The term "personal electronic device" reflects not just ownership but the deeper attitude that a phone is literally a part of one's person. Many panic at the thought of

leaving theirs behind and "phantom vibrations" have become a bodily experience unique to the twenty-first century (Drouin et al. 2012).

4. The effects of such rapidly ubiquitous information are not always positive with respect to narrative construction. Take the case of the Reddit imbroglio of 2013. In their zeal to aid in the capture of the perpetrators of the Boston marathon bombing, users of the social media site collaborated with others users' smartphone footage from the scene to mistakenly identify several suspects. Such crowdsourced sleuthing ended up stalling the legitimate channels of justice (Kaufman 2013).

5. We ought to point out that the smartphone's relation to knowledge is not merely one of access but also of production (Brabham 2013). However, looking at the use of smartphones to produce maps and/or informatively tag such maps through crowd-sourcing is beyond the scope of this essay.

6. These maps are often owned by for-profit companies and display advertising nudges designed to make the user purchase goods and services. These maps can even track one's movement for the sake of delivering individually tailored advertisements or other behavioral nudges. While beyond the scope of this chapter, we recognize that this is a hugely problematic issue of central importance to a comprehensive account of everyday technological practice.