LIVING
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Edited by

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Living Inside Social Mobile Information
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Preface and Acknowledgments

On a delightful April day in 2013, on the banks of Boston's Charles River (where some of Massachusetts' finest universities are located), a talented group of international scholars gathered to consider how the increasingly mobile nature of information technology is affecting human interaction and social organization. The conference, like this book, had the title Living Inside Mobile Social Information. Each of those words is important. The term *living* points to the enacted nature of the process, while *inside* connotes both the internal and integrated nature of the experience of having mobile technology in one's life, as well as the fact that practically all people are now part of the *mobile* culture. It is simply assumed that one can and should be available and reachable—if not by anyone, at least by someone; one can no longer be "outside" of mobile communication. *Social* denotes the human context of the word *information*, and their pairing indicates that the data which constitutes information flows through human lives and is therefore interpreted by people seeking to make meaning out of the material.

In the saturated world of mobile communication, there is only "inside," and the "outside" from which we can gain an external perspective is vanishing. However, much knowledge can be gleaned from being insiders. Using a metaphor drawn from the local scene near Boston University, we can invoke the famous stained glass Mapparium at the Mary Baker Eddy Library, part of the Christian Science Center in Back Bay, Boston. Opened to the public in 1935, this three-story structure allows one to stand in the center of a three-dimensional, stained glass globe and take in a 360° view of the Earth's surface. Commentators have noted that the Mapparium

is without equal in the world: this dome is unique in that it is the only existing platform from which an observer can see the Earth's face undistorted by the effects of positional perspective. As the *Atlas Obscura* website notes in their section on this captivating landmark, even when looking at an ordinary globe, perspective distorts the relative sizes of relationships among the continents.

Although we cannot make a similarly bold claim for the papers presented in this volume, we nonetheless trust that they give the reader at least some new perspectives on the world in which we live. And, of course, the views presented—unlike those available in the Mapparium—are affected by the selectivity and perspectives of the authors and editor, as well as of course the limitations of the data. Still, we put them forward as one in a continuing series of steps to better understand and analyze the world of communication around us. It is a perspective offered from the inside.

This Living in Mobile Social Information workshop and book was sponsored by the Division of Emerging Media Studies at Boston University's College of Communication and cosponsored by Microsoft Research and Motorola Mobility. It would certainly not have been possible without the generous encouragement and support of many people. Colleagues Deven Desai, Nancy Baym, and Rick Whitt passionately applied their efforts to support the workshop and contributed fruitfully to it. We acknowledge with gratitude the support of Microsoft Research New England and Motorola Mobility. Dean Tom Fiedler of BU's College of Communication gave great encouragement as we moved forward with this particular project. Elizabeth Crocker, Allison Hoyt, Anshul Jain, and Kim Relick were instrumental in helping the meeting earn high praise from the participants. Allison Keir provided dynamic assistance at every level, and made myriad logistical details come together seamlessly.

Those who participated in the event included Juan Miguel Aguado, Lora Appel, Emilio Arruda, Nancy Baym, Jeffrey Boase, Joe Bayer, Scott Campbell, André Caron, Letizia Caronia, Richard Chalfen, Yi-Fan Chen, Deven Desai, Jonathan Donner, Thomas Fiedler, Leopoldina Fortunati, Jacob Groshek, Ichiyo Habuchi, Matthew Hibberd, Anshul Jain, Allison Keir, Christian Licoppe, Rich Ling, Misa Matsuda, Keita Matsushita, Peppino Ortoleva, Natalia Radywyl, James Shanahan, Satomi Sugiyama, Matteo

Tarantino, and Eriko Uematsu. My thanks goes to all those who participated in the workshop and helped make it a lively exploration of ideas.

We are indebted to our international scientific advisory board. Many members were able to attend the event itself, but we acknowledge here those who were not. They include Naomi Baron, Genevieve Bell, András Benedek, Gerard Goggin, Joachim Höflich, Yu-li Liu, Jari Multisilta, Vic Nalwa, Kristóf Nyíri, and Elin Rønby Pedersen.

As a closing note, this book is available online and downloadable as a PDF. Further information may be found at http://www.bu.edu/com/mobile-life-workshop/proceedings.html. Physical copies may be purchased at a nominal charge by contacting:

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Part 1

Theoretical Framework

1

Introduction: Reaching Beyond the Mobile Social Frontier

by

Anshul Jain, Boston University

This book presents selected research papers from the Living Inside Mobile Social Information (LIMSI) conference held at Boston University from April 29th to 30th, 2013. The workshop was hosted by the Division of Emerging Media Studies, which is a newly inaugurated academic unit housed within Boston University's College of Communication. The chapters here represent both the cutting edge of mobile social media studies as well as the increasingly interdisciplinary nature of contemporary communication research—it would be injudicious and counterproductive to force this collection of research topics into strictly confined categories. As infrastructure for mobile technology advances, it grows more interconnected with other systems, affecting ever-wider portions of our existence. (Here, in discussing "existence," we can point to the economic, political, social, cultural, ethical, and philosophical levels of human enterprise that it encompasses.) In contrast with so many other fields, mobile social media studies are notable for the absence of a set of shared questions to guide research. Further, as this fascinating field continues to grow, the evidence becomes stronger that traditional individual disciplines such as economics,

political science, and sociology—or even more recent arrivals such as communication—do not address many important queries on their own. While individual disciplines propose essential building blocks towards greater understanding, coordinated strategies are needed. Scholars of the unique subfield of mobile social communication must somehow handle the challenges of combining specific pieces of knowledge from a broad, scattered landscape with a comprehensive understanding of causes, effects, models, and trends. The cross-disciplinary demands that arise alongside emerging media platforms require highly developed, yet well-rounded, research practices. The authors of these chapters rise to this task impressively, addressing a provocative array of issues and challenges, and offering innovative approaches and insights.

Key Questions

One overarching set of questions addresses mobility itself. The authors collectively ask: *What are the motives for and consequences of the personalization of ICT platforms?* Another important set concerns sociability—or, more accurately, sociality. Here, they ask: *What is the effect of individual users' increased capacity to speak with, across, above, and around authorities, institutions, organizations and each other?* While recognizing that mobile interactivity takes place in many different physical and cultural settings, the authors remain diligent in their focus on the central role of the technology itself. Some more specific, common inquiries center on the evolution of platforms and content: *How are mobile media tools adopted in different physical, social, economic, and political settings? How do the nature and impact of social media content change in response to the needs, preferences, and desires of different user bases?* Also addressed is the relationship between the usefulness of emergent communication platforms and concerns over privacy, individual rights, and personal choice: *In helping us work and play with greater speed and efficiency, what are the potential risks to our traditional social and cultural values?*

A fifth group of questions probes the relative strengths and weaknesses of links between users and across communities: *Is mobile social information making our interactions with others more meaningful, or are we simply connected to more people on a shallower*

basis? Are these technologies perhaps redefining the ways in which we think of being "tightly" or "loosely" connected? Lastly, the authors share in common a commendable awareness of the ever-present queries of the offline/non-mobile world. They pay close attention to the role of personal choice in how technologies are used and not simply how they are created. Furthermore, they look beyond the simple dynamics of how technology is obtained and into how it is actually used. Rather than pursuing investigations inside self-contained bubbles, these studies consider the effects of mobile social information on the much bigger reality around us.

Methodological and Theoretical Framing

Though venturing into complex theoretical territory, these studies also demonstrate the value of collecting original data in "outside-the-box" research settings (tracking application usage, for instance). Overall, the authors employ different combinations of four general approaches: roughly half of these studies engage in some form of ethnographic analysis (often referred to as "deep research" or, taking a page from anthropologist Clifford Geertz, "thick description"), while the other half generally pursues a structural and comparative analysis of information platforms; this method focuses more on the processes of interactivity and tends to include more empirical data. Fortunately, as is illustrated in this collection, the authors who focus on structural and comparative analysis did not lose sight of broader theoretical explorations. Noteworthy in this regard is that two of the contributors, Appel and Donner, created and installed original applications for the purposes of their studies.

The table below demonstrates how, together, the authors of these studies cover many bases of analysis and inquiry.

	ETHNOGRAPHY	*STRUCTURAL/COMPARATIVE PLATFORM ANALYSIS*	*THEORETICAL EXPLORATION*	*PLATFORM/APPLICATION INSTALLATION OR CREATION*
Aguado and Martinez	X	X	X	
Appel	X			X
Campbell, Bayer, and Ling			X	
Donner and Maunder		X	X	X
Fortunati		X	X	
Kotamraju and Ben Allouch	X			
Licoppe	X	X		
Ling and Mardanbegi			X	
Ortoleva			X	
Radywyl	X	X		
Tarantino		X	X	

The theoretical framing of these studies is similarly complex: while some of the authors focus more on individual adaptation and applied usage, others more deeply explore philosophical questions. Yet another theoretical direction compares and contrasts how individuals and institutions learn and use new mobile social media technologies. Beyond theorizing and offering examples that illustrate new techniques, these investigations also offer glimpses of how this type of research can help answer questions in other technological and cultural settings. Overall, these chapters illustrate that such studies are truly necessary in order to address much bigger issues that are of interests to many scholars across many disciplines.

Chapter Overviews

Chapter 2: "The Case of the Disappearing Phone: Implications of Google Glass for the Embeddedness of Mobile Communication"

In this chapter Scott Campbell, Joseph Bayer, and Rich Ling cast a wide and ambitious net, seeking to develop a theoretical framework that explains the role of emerging mobile platforms in modern social interactions. In addition to examining embeddedness at the

intersection of sociological, psychological, and cognitive inquiry, the authors also aim to consider the effects of wearable, mobile, head-mounted communicative display technologies (Google Glass, in this case) on individuals and on society at large. Premised on earlier scholarship describing the expansive social demands of mobile technology (Katz 2008; Ling 2012; Vincent 2006), Campbell, Bayer and Ling depict the concept of embeddedness as one consisting of two parallel trajectories: (1) in social structures, mobile technologies have moved from the position of novelty artifact to social necessity, and (2) in cognitive processing, mobile technologies have shifted from prominent considerations to granted afterthoughts as described in earlier work by Ling. Turning to Google Glass, the authors describe the most essential affordance of the device, visual integration, which allows the device to serve as a "third eye" for the user as it tracks the surrounding environment. Perhaps more importantly (and more relevant to the fundamental questions in this volume), Campbell, Bayer and Ling envision future circumstances in which the integrated visual fields of interactivity alter the norms and expectations of social behavior as users can take in, and exude, an increasing volume of physical cues. Furthermore, these cues exist on both the human and technological levels, and the authors justly wonder if the aforementioned social necessity and cognitive casualness are exacerbated by the less demanding specificity of device adoption.

This chapter presents compelling arguments and rationale by which one can reflect on the direction of wearable, mobile, head-mounted devices. Further inquiry would benefit the most from the development of consistent empirical measurement processes and a formalized set of sampling protocols for field study. At such a point, examination of their questions can move towards more fruitful resolution.

Chapter 3: "Homo ludicus on the Move: Play, Mobility and the Fragmentation of Time"

Peppino Ortoleva offers a refreshing analysis of how mobile social interactivity is affecting one specific subset of human interactions:

the realm of play. Far from presenting a micro-scaled inquiry into the mechanics of a limited behavior, Ortoleva places play activity in a broader historical context, linking its evolution to the wider development of mobile technologies and to a variety of pertinent cognitive and social outcomes. His critical points not only prompt careful thought about its changing nature, but reexamination of conceptions of play activity's positioning within the broader human experience at both individual and collective levels. The most important element of Ortoleva's thesis is the definition he puts forth of *Homo ludicus*, a being defined both in opposition and complementary to the depiction of *Homo ludens* posited by cultural historian Johan Huizinga (1955). Whereas *Homo ludens* operates with defined boundaries between work and play, *Homo ludicus* does not. Work and play activities permeate both the serious and frivolous realms of the human experience, fragmenting time and attention—*Homo ludicus* is never fully at work, nor is he fully at play. In Ortoleva's view, mobile technology only accelerates this comingling, further fragmenting our distinctions of how time is spent, as well as imparting momentum towards ever greater ubiquity of ludic activity. In addition to examining how mobile technologies are changing ludic behavior, this chapter also considers how they are altering human relationships with the machine. Again, the author argues for the accelerated movement towards ludic ubiquity.

Ortoleva's thesis is grounded in well-formed theory and supported by illustrative statistics. His arguments on expansive ludicity, however, do not address key questions with respect to nonparticipants, digital divide, reflexive resistance, the challenge of sustained interest, and the stubborn persistence of traditional nonmachine ludic activities across the human spectrum. Future research supporting his theories of fragmentation and ubiquity would probably be best supported through survey research comparing divergent sample populations, supplemented by ethnographic field interviews to probe the underlying thought processes of how human perceive and interpret their changing mobile-fueled environment.

Chapter 4: "Future Issues of Living Inside Mobile Social Information, or, if We Slice and Dice Ourselves, Do We End up as Frankenstein?"

Branching out from the social effects of individual applications and practices, Leopoldina Fortunati pursues a broader inquiry into the effects of specific platforms and the associated phenomenon of augmented reality. Looking at QR (Quick Response) codes and Google Glass, she considers their roots in prior mobile technology and the ramifications of altered mechanics of perceptions of the broader world around the user. Fortunati builds on prior scholarship, arguing that contemporary mobile media have inherited characteristics of addressing users' needs and desires (Haddon 2004; Ling 2004; Ling and Donner 2009), of harnessing the ability to propagate quickly (Harris and Vincent 2008), and of shaping the perception of these platforms as truly global devices (Fortunati 2004). Regarding QR codes, Fortunati presents a curious paradox: while having the capacity to augment reality by serving as the critical conduit between the print and online world, they largely fall short of their potential impact—they are used almost entirely as linking devices with marginal interactivity. With respect to Google Glass, the author acknowledges that its still-ongoing development makes it difficult to ascertain concrete patterns or effects, but she questions the utility of the technology. Perhaps most interestingly, she challenges the basic premise of Glass: namely, that the increased flow of information translates into superior user experiences. Her counter to this narrative is that the industrial regulatory mechanics of the product's distribution alter the fundamental dynamics of device ownership, thus disempowering the user.

Fortunati's assertions, based on a structured survey of more than 800 respondents, are much more strongly supported than her arguments related to Google Glass. As she has noted, Glass is still in development; more importantly, the history of ICT acquisition and adoption shows a unique ability of users to propel technologies towards unforeseen realms of utility. Nevertheless, her central challenge to the essential benefits of increased information volume bear further inquiry, both with the aforementioned devices and with mobile social platforms more generally.

Chapter 5: "The Relationship is the Medium: Understanding Media in a Mobile Age"

In this final chapter, Juan Aguado and Immaculada Martínez present a sophisticated investigation into the evolving dynamics of content consumption patterns, advancing both a new theoretical framework and several resulting assertions. The authors begin by challenging the traditional heterodoxy of sociological and techno-economic perspectives, arguing that this outdated classification scheme fails to consider the ways in which mobile media platforms have fostered codependent processes of usage and meaning. Along with positing an inclusive, encompassing theoretical umbrella, Aguado and Martínez present three main findings:

> 1) The success (or failure) of traditional media outlets is increasingly dependent on their ability to distribute digital content in nascent mobile social formats. 2) Whereas traditional platforms monetized their operations through content consumption and advertising, emerging mobile media providers are monetizing personal information and relationships. 3) The management of personal information and networks is increasingly important, both to providers and consumers. This is because evolving rituals of consumption have broad implications for the ways that consumers interpret and formulate their individual identities.

Aguado and Martínez's findings are the result of a four-year study consisting of structural and content analysis of applications, field observations, focus groups, and individual interviews. Interview subjects were drawn from pools of telecom operators, handset suppliers, application developers, content producers, and smartphone and tablet users. The authors chose to focus more of their efforts on advancing their theoretical perspectives that, though intricate and complex, are well-developed and lucidly presented. However, deeper discussion of methodology and empirical results would both further illuminate their argument as well as provide a base for future research.

Chapter 6: "Living Inside Location-Aware Mobile Social Information, The Pragmatics of Foursquare Notifications"

Christian Licoppe's study represents an extension of empirical research on Foursquare beyond its prior foci of informational, cognitive, and psychological heuristics. Building on earlier work in the realm of social negotiation dynamics (Brown et al. 2007; Cramer et al. 2011) as well as long-established scholarship on derived communicative meaning (Dewey 1958), Licoppe presents a model in which location-sharing in Foursquare materializes as an interactive process of "invitation." Based on field observations and interviews with thirty subjects in Paris in 2011 and 2012, this study demonstrates importance in both the phenomena of opportunistic—rather than strategic—communication, as well as in the role of spontaneity. With respect to associational strength, Licoppe offers a valuable level of depth on the topic of weak ties: rather than simply categorizing them in contrast with stronger ones, he posits that the weak-tie interactions of Foursquare constitute the organic capitalization of ambiguous relationships and diffuse personal networks. The invitations he describes are rarely meant for complete strangers, but are also not directed at close family and friends. In addition to articulating a well-formulated paradigm of the invitation in an emergent context, this chapter raises important questions about the understudied dynamics of these weak ties, the potential ramifications for conceptions of social expectations, and obligations and the evolving nature of increasingly diffuse personal networks.

Some other questions that this research could potentially address are the broader ramifications for civic engagement, the effects of mixed platform usage, the deeper specific role of self-presentation in the illustrated invitation process, the contrasts between individual and group dynamics, and the role of soft rejection practiced through the ignoring of these invitations. In the longer term, it would be worth re-examining these queries with more attention to structural platform constraints as Foursquare operates in an increasingly crowded field of location-based sharing applications.

Chapter 7: "Synergies between Head-Mounted Displays and Head-Mounted Eye Tracking: The Trajectory of Development and its Social Consequences"

Rich Ling and Diako Mardanbegi take up a predictive analysis of the longer-term impact in the fusion of head-mounted displays with eye-tracking devices and the incorporation of both technologies into mobile tools. They argue that this aggregation will ultimately materialize as a single platform that significantly alters the communicative capabilities of its users. Ling and Mardanbegi explain that the advent of eye tracking will allow for a vast suite of inputs beyond vocal prompts, and that the additional feature of mobility will allow for far more complex, detailed sharing of information. While offering specific glimpses into the potential for individual user adoption, the authors are careful to emphasize a top-down model of diffusion, with institutions first acquiring the technology to meet specific, high-level challenges. Only at later points do they see these hybridized platforms achieving more generic popularity.

Ling and Mardanbegi offer a clear window to the possibilities of head-mounted displays based on solid theoretical trajectories, but some further exploration is warranted. With respect to privacy and legal issues, there is the concern that a unitary, hybridized platform risks establishing the nonconsensual permanence of the ephemeral, the publicizing of the inwardly intended, and the misreading of cues based on general—but not universal—characteristics associated with specific physical movements (e.g., rapidly shifting eyes as indicative of dishonesty). Another interesting path of follow-up research would be the implications of hybridized mobile display and tracking technologies on the ethical expectations of communication. Specifically: might a new set of norms and boundaries arise that take into mind the more expansive capabilities of this enhanced communication? Or, rather, might the unprecedented reach of such emergent technology prompt reflexive backlashes against perceptions of intrusion and loss of personal agency? The answers to these issues are relevant not only to Ling and Mardanbegi's research, but also to questions of mobile social information in a broad sense.

Chapter 8: "Beyond the Phone Number: Challenges of Representing Informal Microenterprise on the Internet"

Jonathan Donner and Andrew Maunder's study asks two basic questions: (1) does the web understand microenterprise? and (2) does microenterprise understand the web? Beginning with these simple starting points, the authors show that in the current global push to secure web access for microenterprises, the complexity of interactions across social networks, developmental organizations, and entrepreneurs themselves necessitate a far more nuanced examination. To this end, Donner and Maunder offer a thoughtful, methodological approach that examines the creation and content of microenterprise via Kuza.com, a portal designed to promote entrepreneurial entities in Kenya and South Africa. In addition to evaluating individual websites and their associated prominence in search engine results, the authors also delve into the challenges that arise from determining where personal and commercial usage overlap or stay separate, how identities are negotiated in the online entrepreneurial landscape, and what obstacles stand in the way of individual microenterprise leaders finding ways to effectively express, articulate, and benefit from their online presence. Donner and Maunder identify five key findings:

> 1) Microenterprises face difficulties due to the lag in learning how to communicate in the language of the site. 2) Microenterprises face the problematic tradeoff of either offering a more advanced interface to fewer potential customers via smartphone optimization, or offering a more rudimentary interface to a far larger pool of users by designing for 2G (or lower) data infrastructure. 3) Microenterprises must design online presence not only with the goal of conveying information, but also around the specific objective of projecting credibility. 4) Entrepreneurs routinely find ways to steer particular software feature usage towards other objectives, such as organically performing search engine optimization (SEO); the phenomenon of necessity breeding inventiveness also applies to ICT platforms with new users who have not been socially conditioned to conform to traditional implicit boundaries and guidelines. 5) There exists considerable ambiguity and overlap

> when discussing "microenterprises" and "microentrepreneurs," as distinctions between the personal and commercial, the real and the aspirational and the individual and the organizational are not always possible.

The authors explain that Kuza and other developmental ICTs may experience nascent phases where confusing dynamics of usage predominate, only to emerge later with defined, efficient protocols that were unpredictable at the outset. This phenomenon strikes at the heart of the challenges of empirically studying informal networks. While the authors certainly acknowledge the limited scope of such inquiries (in this case, they refer to issues of class) this paper could benefit from subsequent analysis that considers the specific content of microenterprise sites in more detail. Do correlations exist between certain retail or service categories of microenterprise sites and the various communicative behaviors noted by Donner and Maunder? Do they also exist between firm size, revenue, organizational schematics, or sector competitiveness and these behaviors? Being able to answer these inquiries will greatly advance the ability to answer the two questions that the authors ask at the outset.

Chapter 9: "Maps of Attractions and Conflicts: Some Implications of Socially Networked Spatial Annotation for Socio-Spatial Production Processes"

While much of the scholarship on mobile social media contemplates the globalized nature of device interactivity, Matteo Tarantino's piece considers the relationship between individual users and their sociopolitical environs as mediated by the specific content and interpreted meanings of local geography. His analytical premise is that the combination of mobile media devices and geographic information systems (GIS) with annotation protocols amalgamate in a way that allows for the mass marketing of location-based storytelling systems (LBSS). One consequence of LBSS activity is the phenomenon of assigning narratives to public and private spaces. Tarantino refers to this as a "touristic experience,"

in which individuals and groups have the opportunity to decode, assign, and challenge the collective projection and interpretation of individual spaces, their history, and their ensuing political and social contours. In assessing the operative mechanics of touristic experience, the author examines the behaviors of users engaged with MIT's OpenLOCAST platform.

In addition to building on sociocultural production processes described by LeFebvre (1991) and ownership dynamics, Tarantino argues that the expansion of mobile media platforms will increase the opportunities not only for touristic experience, but for contest and conflict over spatial narrative of specific locations. This chapter presents compelling arguments about the future directions of touristic experience, but could be augmented with inquiry into how platforms other than OpenLOCAST might produce different results due to operational protocols. Additional, helpful follow-up could focus more pointedly on the experiential annotation of specific conflict sites. Alternately, a similar analysis might be conducted that compared annotation of specific conflict sites in markedly different cultural settings. Such an analysis would help test Tarantino's thesis on the role of LBSS devices in fostering contest and conflict over spatial narrative, as well as whether or not this evolving behavior as he sees it is generalizable across different social and political settings.

Chapter 10: "Put a Face to a Name: The Use of Photographs in Health Information Systems to Reduce Anonymity and Improve Communication"

In this study, Lora Appel evaluates the performance of Put a Face to a Name, a trial program at a teaching hospital in Toronto, Canada, that aims to improve the quality of patient care. The underlying hypothesis of the program is that if patients' and clinicians' photographs, along with essential descriptive information, were made available through specifically designed software in the hospital information system, patients' memory recall and communication with hospital staff would improve. This improvement will presumably lead to better medical decision-

making, clinical responsiveness, and quality of care. In the trial, Appel methodologically collected data from a controlled trial, supplemented with qualitative interviews of both patients and clinicians. The trial population was subdivided into three groups: patients with access to their clinicians' photographs and professional descriptions, patients with access to just the clinicians' professional descriptions, and patients with no explicit clinician information provided to them. Subsequent qualitative interviews addressed patients' and clinicians' comfort with, or concerns about, the program. Her findings thus far point to general patient comfort and satisfaction with the program. From the feedback she has collected, patients' desired improvements—more detailed information, the highlighting of clinicians who more frequently attended to them, and the inclusion of nurses—would demand considerable efforts towards a major digital reorganization of hospital information systems. An interesting corollary to her findings is that clinicians, while embracing the project, expressed many more reservations. Their reluctance was, in some cases, motivated by concerns over privacy and security, but also over status and a generalized aversion towards more prominence in the patients' experiential environs.

Appel's findings suggest important lessons for the Put a Face to a Name project and to the larger Canadian healthcare system. However, more generalizable applicability of her research would be better distilled with a detailed understanding of the mediating role of the Canadian health system—its centralized national structure and organization might play an important role the implementation and viability of the trial. Understanding this program and its reception will be far more illuminating with study of these additional contextual contours.

Chapter 11: "Employers' Use of Online Reputation and Social Network Sites in Job Applicant Screening and Hiring"

In a field where studies of individual agency predominate, Nalini Kotamraju and Somaya Ben Allouch provide a refreshing reminder that elites and institutions comprise the other half of the communicative universe. Their examination of how employers

screen and evaluate applicants' online reputations and social network presence during the job search points to the expanding operational ability of institutions to closely examine information that was previously less accessible. Additionally, it reveals that these expanded abilities are, nevertheless, functions of human behavior subject to arbitrary measures of personal impression and judgment. Kotamraju and Ben Allouch conducted interviews with eleven "gatekeepers," human resource professionals and recruiters drawn from a variety of companies in the Netherlands. They present three main findings: the high variability of screening activities, a key role for curiosity in the review process, and an essential importance of photographic evaluations. Concerning variability, they argue that gatekeepers use information from screenings in very different ways depending on the nature of positions, the circumstances of vacancies and the specific stage of a given applicant's review process. On the matter of curiosity, Kotamraju and Ben Allouch describe it as a motivator for seeking information, but also an emotion often proceeds without any particular targeting. They report that gatekeepers are often not in search of any information in particular, but rather are guided by a desire to develop a "sense" or "feel" for the applicant, their dispositions, their professionalism, and other holistic (but often less intangible) qualities. Perhaps most provocatively, the authors argue for the central role of photographs in the screening process: they explain that recruiters, while fully aware of the potential for conscious or unconscious bias, articulated that photographs are not only important, but are frequently more important than any other information, particularly in addressing less precise curiosity-based queries.

Kotamraju and Ben Allouch's interview data corroborate the logic underpinning the increased curating of online presence and reputation. However, their findings could also prompt discussion of deeper questions about the ethics of screening practices in general and the regulatory labor environment in which firms operate. Future research could offer great insights by addressing the more precise mechanics of how curiosity operates and frames gatekeeper behavior, the potential link (or disconnect) between rigorous screening activity and eventual employee performance, as well as the effects of having a minimal or totally absent online presence.

Chapter 12: "Occupying the Commons: A Practice for Citywide Resilience"

In this chapter, Natalia Radywyl considers the impact of mobile applications on the longer-term legacy of the Occupy Wall Street movement. Her argument centers on the concept of an "urban commons," a combination of online social interactivity and street-level practices that, in this case, emerged from the sophisticated open protocols of the movement. Using the multi-method approach of ethnographic field interviews, archival media and structural platform analysis, Radywyl argues that the enduring legacy of OWS is most evident in its reconfiguration as an aid-oriented organization following Hurricane Sandy. Building on Shove and Walker's (2010) work on materials, competences, and meaning, she constructs an image of the movement as a "community of practice" with a sense of place, belonging, hyper-localization of community, and developmental infrastructure. She also explores the phenomenon of the reappropriation of private space for public use, putting forth the notion that while OWS was proximately unsuccessful in pursuing its political-end economic agenda, its adaptive resilience was evident even a year later as previously fragmented components of the former network used their communicative infrastructure to mobilize around the new objective of hurricane relief.

Some questions that might bear further examination are those addressing the resilience of elite institutions and the development of hierarchical structures within the (presumably) more flexible format described by Radywyl. Perhaps, more importantly, it is worth considering whether her modeling might overlook the fact that the popular objective of hurricane relief was not in conflict with the goals of established institutions of power. It would also be beneficial to compare the evolution and reconfiguration of OWS with other movements such as the Tea Party, a group that potentially also qualifies as a community of practice but which has arguably achieved more enduring political relevance.

Conclusion

13

The Cell and the Self: If We Slice and Dice Ourselves, Do We End Up as Frankenstein?

Overall, the chapters in this volume represent a broad spectrum of topics, approaches, and insights that collectively constitute a great influx of new understanding about how mobile social platforms are changing the way that individuals, groups, and entire societies interact; formulate senses of self and belonging; define and redefine customs and behaviors; relate to institutions of government, work and culture; and generally develop interpretations of the ever-changing world in which we live. All of these studies could benefit from follow-up discussions that probe more deeply into their methodological tracts and empirical findings, especially since they all offer solid foundations on which future scholarship can hopefully proceed. Most importantly, however, they present a wide sampling of effective analytical approaches that get us closer to answering persistent questions that cut across many disciplines and continue to be of ever-increasing importance to the ecology of emerging media.

References

Brown, Barry, Alex Taylor, Shahram Izadi, Abigail Sellen, Joseph "Jofish" Kaye, and Rachel Eardley. "Locating Family Values: A Field Trial of the Whereabouts Clock." In *UbiComp '07: Proceedings of the 9th International Conference on Ubiquitous Computing*, edited by John Krumm, Gregory D. Abowd, Aruna Seneviratne, and Thomas Strang, 354–71. New York: ACM Press, 2007.

Cramer, Henriette, Mattias Rost, and Lars Erik Holmquist. "Performing a Check-In: Emerging Practices, Norms and 'Conflicts' in Location-Sharing using Foursquare." In *Proceedings of the 13th International Conference on Human Computer Interaction with Mobile Devices and Services*, 57–66. New York: ACM Press, 2011.

Dewey, John. *Experience and Nature*. New York: Norton & Company, 1958.

Fortunati, Leopoldina. "The Local and Global Dimension of the Cell Phone." Paper presented at the Global and the Local in Mobile Communication: Places, Images, People, and Connections Conference, Budapest, Hungary, June 2004.Geertz, Clifford. "Thick Description: Toward an Interpretive Theory of Culture." Chap. 14 in *Readings in the Philosophy of Social Science*, edited by Michael Martin and Lee C. McIntyre, 213–31. Cambridge, MA: The MIT Press, 1994.

Haddon, Leslie. *Information and Communication Technologies in Everyday Life: a Concise Introduction and Research Guide*. Oxford: Berg, 2004.

Harris, Lisa, and Jane Vincent. "Effective Use of Mobile Communications in E-government: How Do We Reach the Tipping Point?" *Information, Communication and Society* 11 (2008): 395–413.

Huizinga, Johan. *Homo Ludens: A Study of the Play-Element in Culture.* Boston: Beacon Press, 1955. Originally published as *Homo ludens. Proeve eener bepaling van het spelelement der cultuur* (H.D. Tjeenk Willink, 1938).

Katz, James E. "Mainstream Mobiles in Daily Life: Perspectives and Prospects." In *Handbook of Mobile Communication Studies*, edited by James E. Katz, 433–45. Cambridge, MA: MIT Press, 2008.

Lefebvre, Henri. *The Production of Space*. Vol. 30. Oxford: Blackwell, 1991.

Ling, Rich. *The Mobile Connection: The Cell Phone's Impact on Society.* San Francisco: Morgan Kaufmann, 2004.

———, and Jonathan Donner. *Mobile Phones and Mobile Communication*. Cambridge: Polity Press, 2009.

———. *Taken for Grantedness: The Embedding of Mobile Communication into Society.* Cambridge, MA: MIT Press, 2012.

Vincent, Jane. "Emotional Attachment and Mobile Phones." *Knowledge, Technology, and Policy* 19, no. 1 (2006): 39–44.

2

The Case of the Disappearing Phone: Implications of Google Glass for the Embedding of Mobile Communication

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The aim of this chapter is two-fold. First, we will introduce a new theoretical framework for understanding the structural role of mobile communication in contemporary social life. Actually, the framework advanced here is not entirely new. As we explain, it is an expansion of Ling's (2012) recent theory building on the embedding of mobile communication, resulting in its "taken-for-grantedness." Starting from a macro-sociological standpoint, Ling's perspective offers a new way of understanding the consequences of mobile communication's embeddedness at the societal and collective levels. In this chapter, we attempt to expand this perspective to account for recent changes in human orientation toward mobile communication at the cognitive level. In that sense, we are essentially attempting to bridge the gap between sociology

and psychology, offering a synthesized model of how the embedding of mobile communication has not only altered the structure of society, but also worked its way into conscious and unconscious cognitive processes that underlie human behavior. With that framework in place, we will then segue into the second major goal of this chapter, which addresses the implications of wearable head-mounted display communication technologies for embeddedness at the social and psychological levels. We are particularly interested in highlighting the ways this new, or at least expanded, theoretical integration can provide guidance in identifying and developing areas of inquiry. Using Google Glass as a case study, we apply the new framework for theorizing how key affordances may have distinctive implications for the way people relate to the technology, each other, and society.

Embeddedness of Mobile Communication: from a Sociological Perspective

The process of embedding refers to the way that mobile communication as a distinctive form of social mediation has worked its way into and throughout daily life as it achieved critical mass (in the absolute sense). The social ecology has been fundamentally adjusted to accommodate the central role that mobile communication now plays in coordination, expression, and, increasingly, the exchange of information and digital content. As this process of embedding takes place, users become more attached to the technology, even bound to it (Vincent 2006). They also expect others to feel the same way, particularly with regard to heightened expectations of accessibility. Ling (2012) advances "The Katz Principle" to make this point. Here, he credits James Katz (2008) with observing that if someone is not available via mobile communication, it has now become *our* problem, whereas not long ago it was mainly just *their* problem. As these shared expectations become structurally embedded, mobile communication—as a social practice—is increasingly taken for granted (Ling 2012).

This conceptualization of embedding helps explain the evolution of mobile communication from something new to something nice to have, to a fundamental expectation. These "moments" of change resonate with the domestication framework, which identifies key

transitional periods of technology adoption and use for analytic traction in considering the meaning and consequences of new media in a given context, such as a household or network (Haddon 2003; Silverstone and Haddon 1996; Silverstone, Hirsch, and Morley 1992). Drawing from Max Weber, Emile Durkheim and others in the sociological tradition, Ling's perspective widens the lens to examine broader structural changes throughout society and social collectives. Families now rely on mobile communication as essential to the coordination of domestic affairs and tethering/untethering of children to/from parents (Ling 2004, 2005). In the context of business, mobile communication is now integral to both getting and performing jobs. Whereas this used to be primarily the case for high-level executive types, evidence from teens interviewed in focus groups indicates it has also seeped down to lower-level, part-time wage earners (Lenhart, Ling, Campbell, and Purcell 2010). Mobile communication is a primary player on the political stage as well, most obviously in the coordination of protests and revolution (e.g., Hussain and Howard 2012; Rheingold 2008). Perhaps not so obvious is the way mobile communication has also become central to political discourse and engagement in (relatively) stable democracies (e.g., Campbell and Kwak, 2010; 2012). The truth is, mobile communication has become a rather mundane part of these and other stages where social life is carried out. This is not to suggest that it is not important—quite the contrary, in fact. Rather, it has become so embedded into society that it is now taken for granted.

By way of analogy, Ling compares the embeddedness of mobile communication to that of mechanical timekeeping and automotive transportation, two other resources for social mediation that were once revolutionary, but are now difficult to live without. Imagine a person who does not recognize the social construct of time; the individual could hardly function as a member of society. Although less ubiquitous than mechanical timekeeping, automotive transportation (whether it be car, bus, train, or otherwise) is also a core necessity for many individuals throughout the world. Without access to these structural aspects of society, many individuals would completely fall through the cracks of shared social order. This would not only be their problem, but the problem of other individuals (and institutions) that wish to recognize them as part of the social

order. Here we see how the Katz Principle applies to other core resources for social mediation as well.

Up to this point, we get a sense of what position mobile communication occupies in society and how it has developed from something new to something highly fundamental in many, if not most, contexts of daily life. Along with this transition come heightened expectations for accessibility, and mobile communication's emergence as a taken-for-granted means of social mediation. Ling argues that these developments represent new—or at least newly shifted—contours of social structure. To be sure, people have always had expectations for accessibility that have fueled the development and use of new systems of communication. So these expectations themselves are not new, but the degree to which they can be satisfied *in the moment* is new. Mobile phones make us individually addressable: whereas one used to call *somewhere* to reach *someone*, we now call (or text) people instead of places (Ling 2008; Ling and Donner 2009; Wellman et al. 2003). Unlike fixed and portable technologies, mobile devices support the flow of information and communication while physically moving about and/or engaging in the business of daily life activity. It is this potential for immediate, even ambient (Ito and Okabe 2005), access to others that makes mobile communication a distinctive form of social mediation with unique ramifications for shared expectations of accessibility (Campbell 2013).

Embeddedness of Mobile Communication: Toward a Psychological Perspective

Ling's argument about embeddedness draws heavily from sociology, and is therefore particularly useful for thinking about changes in the social structure of collectives and society. We consider this to be a promising framework for understanding implications of mobile communication not only at the collective level, but at the psychological level as well. The core argument we will attempt to develop here is that the embeddedness of mobile communication at the collective level is integrated with embeddedness at the psychological level, which has implications for how people orient to the technology and to each other.

We see both parallels and intersections between the sociological and psychological domains of embeddedness. Along with heightened expectations for accessibility comes a shift in orientation toward mobile communication. As it becomes embedded into our communication and information networks, so too does it become embedded in the self—indeed, as a part of the user (Campbell 2008). Our argument is that this movement toward embeddedness not only alters how we think about mobile communication as a form of social mediation, but also the extent to which we think about it at all.

As it moves into the realm of the mundane, mobile communication shifts from the front to the back of the mind; it becomes second nature, like checking one's watch. Although not always at the forefront, it is always there, like mechanical timekeeping (Farman 2012). It has become an important part of the self in the sense that it mediates an increasing amount of the social experiences through which the self is constructed. From a symbolic interactionist perspective, there is no self without others. In that sense, the self is a social construct. But it is also supported by cognitive processes associated with one's relationships, as suggested by psychological theory on the "relational self" (Chen et al. 2006). Because mobile communication has become so ingrained in how we are connected, it has also become entrenched into the cognitive processing that supports connectedness. In that sense, heightened expectations for accessibility at the collective level translate into the embedding of mobile communication into the cognitive processes underlying social behavior. This is evident in the focus groups for a Pew project (Lenhart et al. 2010), where participants discussed reflexively checking their device when it beckons, looking down at the screen throughout the day for the time, and routinely checking it immediately upon waking, to catch up on messages received overnight. Much of this is done without a lot (if any) thought. The technology can even trigger an automatic reaction without doing anything, evidenced by "phantom vibrations" where individuals are mistakenly cued to check their phone (Drouin et al. 2012). Such phenomena illustrate how an orientation toward embeddedness and heightened expectations for accessibility has burrowed its way into the subconscious domain of cognition.

Extending the perspective of embeddedness from the realm of sociology to that of psychology is an ambitious undertaking that will involve both small steps and big leaps. In order to take one step in that direction, we will offer an explanation for a puzzling behavior—texting while driving—that helps bridge the sociological principles of embeddedness into the psychological domain. In that sense, we are treating texting while driving as one "case" that illustrates how mobile communication has become an embedded social practice for the self as well as society.[1] Texting while driving is by no means the only meaningful outcome of embeddedness; however, the occurrence of mediated communication even in the midst of high-speed traffic highlights an example of extreme embeddedness—something that wearable technologies hope to achieve at all times.

Texting while driving has become a serious matter of public safety. Research indicates that chances of an accident can go up as much as 2,300% when the driver is texting (Angell and Flanigan 2011; Drews, Yazdani, Godfrey, Cooper, and Strayer 2009). Many studies in this area have focused on the *effects* of texting while driving, usually with an emphasis on the extent to which it impairs drivers and contributes to traffic accidents. Less research, however, has been done to *explain* this behavior. The handful of studies that do try to elucidate texting while driving primarily address it from a psychological perspective, with emphasis on mechanisms located in the conscious realm of cognitive processing, such as explicit attitudes, subjective norms, and perceived behavioral control (PBC) (Atchley, Atwood, and Boulton 2011; Nemme and White 2010; Walsh, White, Hyde, and Watson 2008; White, Hyde, Walsh, and Watson 2010; Zhou, Rau, Zhang, and Zhuang 2012; Zhou, Wu, Rau, and Zhang 2009).

Recent research has shifted attention toward mechanisms in the less conscious realm of cognitive processing, starting with Nemme and White's (2010) suggestion that texting while driving may be

1 Because definitions can vary, it is worth clarifying that our own conceptualization of "texting" encompasses the range of text-based engagements through mobile telephony, including text-based interaction with others (e.g., SMS and social media updates) and interfacing with the device to access and browse content.

related to habitual tendencies. They based this idea on the finding that high frequency of texting was a stronger predictor of this behavior than attitudes or norms. Mere frequency, however, does not differentiate between conscious and unconscious cognitive processing, which is vital in measuring habit (Gardner 2012; LaRose 2010; Verplanken 2006, 2010). To rectify this shortcoming, Bayer and Campbell (2012) conducted a follow-up study with measures that extricate *how* an individual texts (more or less automatic) from *how much* an individual texts (more or less common). As predicted, the "automaticity" (Bargh 1994) side of habit was a significant predictor of texting while driving even while controlling for overall frequency. The bottom line here is that to understand the state of mobile communication in everyday life, we must look beyond conscious considerations and intentions and also account for the less conscious processes that fuel this behavior.

This discovery that texting while driving is at least partially driven by automaticity resonates with our growing understanding of media habits (e.g., LaRose, 2010). According to LaRose (2010), much of our media consumption is habitual. Those kinds of media behaviors, such as channel surfing, start out as conscious attempts to achieve a short-term goal—in this example, to avoid commercial advertisements. Over time, these immediate outcome expectations feed into more latent, long-run outcome expectations. These long-run expectations translate into habit strength (or degree of automaticity), which then translates into media consumption behavior through contextual cues that trigger them. Put differently, media behavior lies on a continuum ranging from conscious to unconscious action. Over time, when immediate goals generate sustained expectations, people develop routinized patterns in their mobile communication that rest more on heuristics than conscious thought (Oulasvirta et al. 2012).

Cues are how habitual processes take off. And mobile devices, in particular, offer a wide range of opportunities to generate cues. Most obviously, there are cues within the technology itself when it beckons through ringing, chirping, vibrating, flashing, etc. Beyond that, there are also environmental and emotional cues associated with the technology. For example, during the Pew focus groups mentioned above, teens reported instances of reflexively taking a picture or texting a friend in response to something they

encountered in their physical environment or experienced as an emotional state. Because the technology can go to virtually any place and can be used at practically any time, it has become an important part of not only the user's identity, but also the social and environmental ecology. Consequently, there are many sources of cues that can trigger mobile-mediated habitual behavior (Bayer and Campbell 2012)—and these processes depend on the technological dimensions, or affordances, of communication devices.

We treat the research presented above as supporting evidence for the overarching theoretical proposition in this chapter: just as mobile communication has shifted from a foreground artifact of attention to an embedded part of social structure, so too has it shifted from the foreground toward the background of cognitive processing. While this demonstrates a pattern of *parallel* movement across sociological and psychological fronts, mobile communication also *intersects* these two fronts in a chicken-and-egg cycle of mutual influence between social behavior and cognitive processing. It is this intersection between these two that calls for an interdisciplinary framework that bridges both streams of theory.

So far we have introduced our interdisciplinary framework regarding embeddedness and then applied it to help solve one of the puzzles that researchers and policymakers have been grappling with in recent years (i.e., explaining texting while driving). We believe our arguments about social and psychological embeddedness have utility not only for explaining past behavior, but for considering the social implications of what is on the horizon as well. In other words, we believe our propositions about the integration of embeddedness across social and psychological levels can help guide future research on emergent trends, in addition to helping explain existing ones. To develop this part of our argument, we shift our attention from the existing "case" of texting while driving to the emerging "case" of heads-up mounted displays—in particular, Google Glass. We see Google Glass not as the innovator of the new heads-up form factor (e.g., Epson's product), but rather as a specific case of something on the horizon that scholars and the popular press are beginning to grapple with.[2] Synthesizing the arguments

2 At the time of this writing, Google Glass was still on the horizon, with only a handful of individuals having sampled the product before its release in the marketplace.

above, we propose that a starting point for this task is to consider what new possibilities Google Glass has to offer for embeddedness, in both the socionormative and psychological domains.

When the Phone Disappears: The Case of Google Glass

As noted above, it is difficult to say whether Google Glass will translate into a revolutionary change in mobile communication for the larger population of users. It may only take root among certain subgroups of users and/or serve as an added layer that is weaved into other mobile communication devices and practices. According to Ling (2012), in order for a technology to achieve "taken-for-grantedness," it must first reach a critical mass of users. Beyond that, adoption is legitimized through a system of shared beliefs, diffusion of the technology changes the social ecology, and reciprocal expectations are developed for its use. Thus, it is difficult to forecast Google Glass's potential to find its own unique place as a taken-for-granted means of social mediation. To us, though, that is not really the important question. From our perspective, Google Glass—as a form of mobile communication, more broadly—is already part of a larger communication system that has achieved this state. To us, the more interesting question is how Google Glass, and its distinctive affordances, present new dynamics to the embeddedness of mobile communication at the socionormative and psychological levels. As we will discuss, there are aspects of Google Glass that seem to resonate with the movement toward greater embedding, while also having the potential to alter the very nature of embeddedness.

From an affordances perspective (Norman 2002), Google Glass offers a distinctive set of characteristics that create new possibilities for embeddedness in social and psychological processes. Ling (2004) characterizes affordances as a theoretical perspective that lies somewhere between social and technological determinism. As a framework for understanding social implications, it places emphasis on the characteristics of a given medium without going so far as proposing those characteristics determine behavior. Rather than determining user conduct, characteristics of the medium (i.e., its affordances) create new possibilities for it. The possibilities

introduced by Google Glass are distinct from those associated with more traditional forms of mobile communication – from basic feature phones to smartphones. Just as the affordances of traditional mobile devices have helped shape embeddedness and expectations for accessibility (to others and now, increasingly, to content), it is likely that the distinctive affordances of Google Glass and the user interface may lead to new dimensions of embeddedness. Our interest here is with the key affordances that comprise the unique interface—involving visual, voice, and gesturing—and the ways they introduce new dynamics for embeddedness at the social and psychological domains.

One of the most notable affordances of Google Glass is the visual integration. Whereas the user's eyes track the screen of a smartphone, Google Glass tracks the scene in front of them, essentially serving as a third eye that captures the user's visual experience in order to share it with others or saves it to experience again later. Just as the technology keeps an eye on the physical environment, the user keeps an eye on the mediated environment with a small display that is implanted in his or her field of vision.

The visual interface of Google Glass represents a step toward greater integration of the mediated and physical stages of social interaction—what some might call the online and offline worlds. The smartphone's affordance of visual display on a small screen somewhat encourages removal of oneself from the world of others around them. We are not suggesting that those small screens cannot and do not connect users to their physical surroundings, only that there is also an element of removal—what Gergen (2002) terms "absent presence"—associated with focusing visual attention down at an artifact during use. Of course there are other existing affordances, such as voice recognition, that also lean toward a more integrated mobile experience, but none to the extent that Google Glass does with this distinctive form factor. Rather than requiring the user to maintain two scopes of visual engagement, the visual interface of Google Glass layers, even weaves, the mobile-mediated connection with the immediate physical surroundings, and those others who also occupy those surroundings.

This visual integration between the virtual and the physical can be considered as movement toward greater embedding of these two social environments. Momentum in this direction can

already be seen in the ways that young people use text messaging, picture sharing, and even video sharing (e.g., Snapchat) as methods of incorporating distant others into the mix of co-present social interaction. However, by visually disengaging with the group to look down and focus on the screen, the lines demarcating the mediated and unmediated realms are more defined with small screens. By consolidating the user's visual focus, they have a more integrated, or embedded, social experience. The embedding of the mediated and unmediated social environments points to some potential shifts at the socionormative level of mobile communication. One of the notable trends coming out of the teen focus groups for the Pew project (Lenhart et al. 2010) was that young people have become accustomed to divided attention. They acknowledge that attending to their phone can be disengaging when they are with co-present others, but it does not bother them. They give each other "a pass" for popping in and out of absent presence. This is a normative arrangement they have worked out socially—and, as they noted in the focus groups, one that is not always shared by their parents, teachers, and other older adults. The point here is that by consolidating visual focus, the normative landscape for what is acceptable and expected is altered. The context that gives meaning to the very concepts of absent and present is notably different with Google Glass. The differences between these concepts become less pronounced, making it more possible for users to have one foot in both worlds at the same time (for better or worse). Thus, Google Glass offers the potential to mitigate absent presence by consolidating visual attention, increasing the user's capacity to integrate their mediated and unmediated experiences. Whether this is actually the case, or if it might just mitigate the *appearance* of absent presence, is an interesting question for future research.

In addition to those socio-normative implications, the embeddedness of Google Glass may also present changes for the user's psychological orientation toward the technology. Even at this early stage, it is not difficult to make connections between the embedding of Google Glass and the discussion above about the habitual aspect of mobile communication. As the technology becomes more entrenched in the self, it moves further into second nature. Such developments in mobile communication resonate with the classic ideas of ubiquitous computing (Weiser 1991;

see Ling 2013), as well as more recent theory on embodiment in mobile media (Farman 2012). Indeed, at least some level of conscious work is reduced in that the user does not have to visually navigate two separate social environments, but rather one that is layered. On the other hand, the possibility of increasingly layered communication may result in more complex practices. Enacting a single conversation may be simpler with wearable technology, but the management of more lines of communication with more interlocutors may be harder in aggregate.

The layered interaction of wearable communication technologies also points to the potential for habitual cues to become more proximal and plentiful. As the number of cognitive steps between them and the behavioral response is reduced, the act of communicating is streamlined. In fact, this appears to be one of the primary objectives of wearable technologies. One of the Project Glass developers emphasized that one goal is to "[bring] technology closer to your senses" (Joshua Topolsky, "I Used Google Glass: The Future, but with Monthly Updates," *The Verge,* February 22, 2013). With Google Glass, habitualized use can be triggered and then acted on without doing much more than saying a word, taking a glance, or waving a hand. With usage over time, these conditions may support habit acquisition to an even greater extent than handheld devices. Beyond exaggerating the development of less conscious processes, the affordances of this type of wearable computing would likely increase the sheer number of cues. Due to the scene-tracking technology of Google Glass, visual cues may now operate on two levels: the human and the technological. A user may prompt communication through mental cues, or the device itself may encourage it through readings of their gaze or reminders of interpersonal goals. Thus, affordances of Google Glass may interact with automatic and taken-for-granted processes—and, in doing so, introduce novel elicitors of interpersonal communication. In total, as the technology moves to more of an embedded or background experience, the balance between manifest and latent cognitive thought is tipped toward the latter. Google Glass, then, may accelerate the automaticity of mobile communication.

In line with the potential for new unconscious rhythms, there is also an opportunity to consider how Google Glass is objectively and subjectively embedded as a part of the self. The affordance

of head-mounted scene tracking means the user is not so much looking *at* the mobile device, but rather *through* it. From the user's perspective, the artifact—as an object—disappears into the body. It is now something other people look at, whereas the user looks through it.

This movement from objective to subjective embeddedness is also supported by other aspects of Google Glass's dissimilar interface. Instead of typing, users rely on oral commands and head gestures to complement the visual component. This mix of affordances has the obvious benefit of freeing up the hands to do other things. With Google Glass, mobile communication is more seamlessly woven into daily life; for these users, mobile communication may become even more a part of who they are because it requires less attending to. Instead of looking down at a small screen while holding the device and typing on it, users speak, gesture, and gaze with the technology. In other words, the way people interface with mobile communication becomes more like the way people interact with each other: we look at, talk to, and gesture with our friends—normally, we do not type on them.

To further illustrate this point about the subjective embedding of Google Glass, we can think about how the oral command interface "subjectifies" the mobile experience. As noted, voice recognition platforms are already out there. Currently, two of the popular ones are Siri and talk-to-text, so the voice recognition aspect of Google Glass is not new. However, its usage in supporting the overall mobile experience is what makes it novel. In fact, voice (along with gaze and gestures) *mediates* the user's total mobile experience. The difference between this and using it only for a particular application is like the difference between an operating system and a particular software package. Voice commands mediate throughout the entire experience; there is a lot of talking involved in the interaction with the technology. Beyond that, the technology gets a name. Users ask or tell "Glass" to do something. ("Okay, Glass, take a picture.") This particular aspect of the interface adds a distinctive nuance to the embedding of the technology in the subjective realm of experiencing it, while diminishing its position in the objective realm. Traditionally, mobile communication has been discussed, in the subjective realm, as a part of who the user is—in other words, as a part of their identity (e.g., Campbell 2008; Walsh et al. 2011).

By naming the technology, it becomes more deeply embedded as subject rather than object, but in a unique way from other forms of mobile communication. Through the regular use of the name "Glass," the technology has a structural component that facilitates recognition of its own subjectivity, signifying a change in how one is psychologically oriented to mobile communication.

It is in that sense wearable communication technologies may come to occupy the territories of self, other, and object concurrently—raising questions about what happens when the user takes them off. Already we know that many users feel a great sense of discomfort without their handheld device. Some even panic (Vincent 2006). Without over-speculating, one can imagine a sense of nakedness when the glasses are removed (at least among those who wear and use them regularly throughout daily life). Moving forward, an avenue for future research is to examine how attachment differs across technologies that are carried, as opposed to those that are worn. Regardless, we imagine that Google Glass and other more integrated form factors will fuel the trend toward heightened expectations for accessibility, while also introducing new dynamics to the relationships between self, other, technology, and society.

To be sure, there are a myriad of ways in which one might consider affordances, embeddedness, and social/psychological shifts associated with Google Glass. Rather than providing a comprehensive analysis, our aim here was to raise a few that are particularly useful in illustrating how select principles of taken-for-grantedness can be utilized to frame the way Google Glass is considered and approached as an area for future research. Drawing from Ling's sociological perspective and extending it to the psychological tradition opens up avenues that will be fruitful for scholars to examine. As they do, researchers should attempt to identify other ways in which Google Glass may become embedded as a part of the social ecology and as part of the self. Without digging too far into promises and perils, we point to areas in which Google Glass and its distinctive interface may alter orientations to mobile communication and to each other. Whether/how this is helpful/harmful (socially and psychologically speaking) also warrants examination. On the one hand, it is important and helpful for social and personal artifacts to become taken for granted: as the use

of daily things becomes more heuristic in nature, our thoughts and attention are freed up for other matters. This means that we come to rely on our daily things to function in ways that are expected. While this may help smooth the flow of daily life activity, there is also the argument popularized by Sherry Turkle (2011) that we have come to rely on our daily digital artifacts a bit too much. In particular, Turkle contends we now are too dependent on our communication technology and not enough on each other. If indeed we are drifting in this direction, then Google Glass and the embeddedness it offers would seem more likely to flow with that drift rather than against it. This calls for future inquiry into both the opportunities and challenges the technology brings about as it transitions from something new to something nice to have, to something expected—if not for society at large, then at least for those who do incorporate Google Glass into the mix of mobile communication.

References

Angell, Linda S., and Helen P. Flanigan. "Technology and software products for preventing and mitigating driver distraction." *Ergonomics in Design: The Quarterly of Human Factors Applications* 19 (2011): 28–30.

Atchley, Paul, Stephanie Atwood, and Aaron Boulton. "The Choice to Text and Drive in Younger Drivers: Behavior may Shape Attitude." *Accident Analysis and Prevention* 43 (2011): 134–42.

Bargh, John A. "The four horsemen of automaticity: Awareness, intention, efficiency, and control in social cognition." In *Handbook of Social Cognition*, 2nd ed., Vol. 3, edited by Robert S. Wyer, Jr. and Thomas Skrull, 1–40. Hillsdale, NJ: Erlbaum, 1994.

Bayer, Joseph B., and Scott W. Campbell. "Texting while driving on automatic: Considering the frequency-independent side of habit." *Computers in Human Behavior* 28, no. 6 (2012): 2083–90.

Campbell, Scott W. "Mobile Technology and the Body: Apparatgeist, Fashion, and Function." In *Handbook of Mobile Communication Studies*, edited by James E. Katz, 153–64. Cambridge, MA: MIT Press, 2008.

———, and Nojin Kwak. "Mobile Communication and Civic Life: Linking Patterns of Use to Civic and Political Engagement." *Journal of Communication* 60, no. 3 (2010): 536–55.

———, and Nojin Kwak. "Mobile Communication and Strong Network Ties: Shrinking or Expanding Spheres of Political Dialogue?" *New Media and Society* 14, no. 2 (2012): 262–80.

———. "Mobile Media and Communication: A New Field or Just a New Journal?" *Mobile Media & Communication* 1, no. 1 (2013): 8–13.

Chen, Serena, Helen C. Boucher, and Molly Parker Tapias. "The Relational Self Revealed: Integrative Conceptualization and Implications for Interpersonal Life." *Psychological Bulletin* 132 (2006): 151–79.

Drews, Frank A., Hina Yazdani, Celeste N. Godfrey, Joel M. Cooper, and David L. Strayer. "Text Messaging During Simulated Driving." *Human Factors: The Journal of the Human Factors and Ergonomics Society* 51 (2009): 762–70.

Drouin, Michelle, Daren H. Kaiser, and Daniel A. Miller. "Phantom Vibrations among Undergraduates: Prevalence and

Associated Psychological Characteristics." *Computers in Human Behavior* 28 (2012): 1490–96.

Farman, Jason. *Mobile Interface Theory: Embodied Space and Locative Media*. New York: Routledge, 2012.

Gardner, Benjamin. "Habit as Automaticity, not Frequency." *The European Health Psychologist* 14, no. 2 (2012): 32–36.

Gergen, Kenneth J. "The Challenge of Absent Presence." In *Machines that Become Us: The Social Context of Communication Technology,* edited by Jamed Katz, 227-41. New Brunswick, NJ: Transaction, 2002.

Haddon, Leslie. "Domestication and mobile telephony." In *Machines that Become Us: The Social Context of Personal Communication Technology*, edited by James Katz, 43–56. New Brunswick: Transaction, 2003.

Hussain, Muzammil M., and Philip N. Howard. "What Best Explains Successful Protest Cascades? ICTs and the Fuzzy Causes of the Arab Spring." *International Studies Review* 15, no. 1 (2012): 48–66.

Ito, Mizuko, and Daisuke Okabe. "Technosocial Situations: Emergent Structuring of Mobile E-mail Use." In *Personal, Portable, Pedestrian: Mobile Phones in Japanese Life*, edited by Mizuko Ito, Daisuke Okabe, and Misa Matsuda, 257–73. Cambridge, MA: MIT Press, 2005.

Katz, James E. "Mainstream Mobiles in Daily Life: Perspectives and Prospects." In *Handbook of Mobile Communication Studies*, edited by James E. Katz, 433–45. Cambridge, MA: MIT Press, 2008

LaRose, Robert. "The Problem of Media Habits." *Communication Theory* 20 (2010): 194–222.

Lenhart, Amanda, Rich Ling, Scott W. Campbell, and Kristen Purcell. "Teens and Mobile Phones." Project of the Pew Research Center and the University of Michigan, April 2010. http://www.pewinternet.org/Reports/2010/Teens-and-Mobile-Phones.aspx

Ling, Rich. *The Mobile Connection: The Cell Phone's Impact on Society.* San Francisco: Morgan Kaufman Publishers, 2004.

———. "Mobile Communications vis-à-vis Teen Emancipation, Peer Group Integration and Deviance." In *The Inside Text: Social Perspectives on SMS in the Mobile Age*, edited by Richard Harper, Leysia Palen, and Alex Taylor, 175–89. London: Klewer, 2005.

———. *New Tech, New Ties: How Mobile Communication is Reshaping Social Cohesion.* Cambridge, MA: MIT Press, 2008.

———. *Taken for Grantedness: The Embedding of Mobile Communication into Society.* Cambridge, MA: MIT Press, 2012.

———. (2013). "From Ubicomp to Ubiex(pectations)." *Telematics and Informatics 31, no. 2*. (2013): 173-83.

———, and Jonathan Donner. *Mobile Communication.* Cambridge, UK: Polity, 2009.

Nemme, Heidi E., and Katherine M. White. "Texting while driving: Psychosocial influences on young people's texting intentions and behaviour." *Accident Analysis & Prevention* 42, no. 4 (2010): 1257–65.

Norman Donald A. *The Design of Everyday Things.* New York: Basic Books, 2002.

Oulasvirta, Antti, Tye Rattenbury, Lingyi Ma, and Eeva Raita. "Habits make smartphone use more pervasive." *Personal and Ubiquitous Computing* 16, no. 1 (2011): 105–114.

Rheingold, Howard. "Mobile Media and Political Collective Action." In *Handbook of Mobile Communication Studies*, edited by James E. Katz, 225–40. Cambridge, MA: MIT Press, 2008

Silverstone, Roger, Eric Hirsch, and David Morley. "Information and Communication Technologies and Moral Economy of the Household." In *Consuming Technologies: Media and Information in Domestic Spaces*, edited by Eric Hirsch and Roger Silverstone, 15–31. London: Routledge, 1992.

———, and Leslie Haddon. "Design and Domestication of Information and Communication Technologies: Technical Change and Everyday Life." In *Communication by Design: The Politics of Information and Communication Technologies*, edited by Robin Mansell and Roger Silverstone, 44–74). Oxford: Oxford University Press, 1996.

Turkle, Sherry. *Alone Together: Why We Expect More from Technology and Less from Each Other.* New York: Basic Books. 2011.

Verplanken, Bas. "Beyond Frequency: Habit as a Mental Construct." *British Journal of Social Psychology* 45 (2006): 639–56.

———. "Habit: From Overt Action to Mental Events." In *Then a Miracle Occurs: Focusing on Behavior in Social Psychological Theory and Research*, edited by Christopher R. Agnew, Donal E. Carlston, William G. Graziano, and Janice R. Kelly, 68–88. New York: Oxford University Press, 2010.

Vincent, Jane. "Emotional Attachment and Mobile Phones." *Knowledge, Technology, and Policy* 19, no. 1 (2006): 39–44.

Walsh, Shari P., Katherine M. White, Stephen Cox, and Ross McD. Young. "Keeping in Constant Touch: The Predictors of Young Australians' Mobile Phone Involvement." *Computers in Human Behavior* 27 (2011): 333–42.

Walsh, Shari P., Katherine M. White, Melissa K. Hyde, and Barry Watson. "Dialing and Driving: Factors Influencing Intentions to Use a Mobile Phone While Driving." *Accident Analysis and Prevention* 40 (2008): 1893–1900.

Weiser, Mark. "The Computer of the 21st Century." *Scientific American*, September 1991, 94–104.

Wellman, Barry, Anabel Quan-Haase, Jeffrey Boase, Wenhong Chen, Keith Hampton, Isabel Isla de Diaz, and Kakuko Miyata. "The Social Affordances of the Internet for Networked Individualism." *Journal of Computer-Mediated Communication* 8, no. 3 (2003). http://jcmc.indiana.edu/vol8/issue3/wellman.html, accessed February 17, 2012.

Walsh, Shari P., Katherine M. White, Melissa K. Hyde, and Barry C. Watson. "Dialing and Driving: Factors Influencing Intentions to Use a Mobile Phone while Driving." *Accident Analysis and Prevention,* 40 (2008): 1893-1900.

White, Katherine M., Melissa K. Hyde, Shari P. Walsh, and Barry C. Watson. "Mobile Phone Use while Driving: An Investigation of the Beliefs Influencing Drivers' Hands-free and Handheld Mobile Phone Use." *Transportation Research Part F: Traffic Psychology and Behaviour* 13 (2010): 9–20.

Zhou, Ronggang, Changxu Wu, Pei-Luen Patrick Rau, and Wei Zhang. "Young Driving Learners' Intention to Use a Handheld or Hands-free Mobile Phone when Driving." *Transportation Research Part F: Traffic Psychology and Behaviour* 12 (2009): 208–217.

———, Pei-Luen Patrick Rau, Wei Zhang, and Damin Zhuang. "Mobile Phone Use while Driving: Predicting Drivers' Answering Intentions and Compensatory Decisions." *Safety Science* 50 (2012): 138–149.

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3

Homo ludicus on the Move: Play, Mobility and the Fragmentation of Time

by

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1. A Synthesis

Mobile devices—particularly cell phones and tablets—are used to talk, to text, and also (more than anything else) to play.

The presence of games in cellular phones began in the 1990s (relatively early in the history of mobile technology), with recreational games being offered by manufacturing companies to make their phones more attractive, particularly to a teen and male public. In the early 2000s, shortly before the birth of the iPhone and tablets, the tendency of mobile phone users of both sexes and of a higher median age to buy games for their devices and to spend part of their time (particularly during life's pauses) playing puzzles and other solitary games, was established by some observers as one of the new businesses of the electronic age.[1] While other forms of mobile entertainment, such as watching TV on a mobile

1 See, for instance, Jyoti Thottam's "How Kids Set the (Ring) Tone," *TIME Magazine*, April 4, 2005.

device, have proved much less interesting for the mass public than earlier forecasts had promised (TV remaining essentially a domestic machine whatever the technologies used), the demand for games as part of mobile devices that had long been considered marginal, has been growing constantly and is now the second most important mobile business, the first being direct interpersonal communication.

What are the roots of this phenomenon? What are the specific characters of playing games on mobile devices, as compared to other forms of human ludicity? Is mobile play a part of more general tendencies of contemporary culture? These are the questions that moved me to write this paper, which is a part of wider research on the changing role of play in this moment of history and in this stage of human-machine interaction.. (A more general statement of my position can be found in my article "Homo Ludicus: The Ubiquity of Play and its Role in Present Society.")

To answer the above-mentioned questions I shall follow these three steps:

1. I shall rapidly explore the world of mobile games—particularly in the most recent years—and the dynamics of the phenomenon, based on some general demographic data. In opposition to a mere technological (and marketing) determinist explanation (according to which people play with their cell phones simply because this is what technology allows and invites them to do), I shall propose a different interpretation that connects mobile gaming to some more general changes in the role of play and games in present culture, particularly (but not only) in what was once called the developed world.[2]
2. Inside this more general frame, I shall synthesize the specific characters of playing "on the move," and its relation to other aspects of human mobility today.

2. Playing on the Move: The Evolution

The possibility of using the cell phone as a playing device (in

2 I wish to thank Araba Sey for helping me in understanding the prejudice that makes people in the developing world favor "useful" functions of machines over playful ones, paternalistically considered to be a waste of time.

ordinary parlance, as a toy), predates the birth of fully "intelligent" mobile machines by a decade—the first iPhone was presented to the market in 2007.

In 1997, exactly the same year when, with the advent of prepaid services, the use of mobile devices started its rapid diffusion among the teenagers of the richest countries, Nokia introduced a few games as part of the services available to the users of its phones. They were very straightforward black and white games, and consumed a very limited amount of computing power. Significantly, they were adaptations of some of the earliest games made for home computers and primitive consoles. A typical example is *Snake*, a game made of a "snake" of black squares chasing another black square around the display. In the simplicity of their design and of their programming, the cell phone games of the late nineties had little to do with the increasingly sophisticated video games that, during the same period, young people (prevailingly male) could play on Nintendo, Sega, or Sony platforms; neither they had much to do with the progressively complicated computer games that were attracting a more varied audience. They showed some similarities with older handheld gaming devices, starting as early as 1976 with Mattel's *Auto Race* and culminating in 1989 with the introduction of Game Boy by Nintendo and its successors and competitors. These devices have in fact been the first to explore the possibility of uniting the pleasure of play with mobility and were conceived to exploit young boys' urge to play out of the home (where classical platforms were "naturally" located).[3]

In any case, we know very little about what the early users of Nokia phones and, later, a variety of other mobile phone brands were making of *Snake* and similar games. They were an inducement (a "bonus") for making a firm more competitive, but they had no market in themselves, and from what we can discern they were not the subject of specific market research.

Less than a decade later in the mid 2000s, as Jyoti Thottam noted in her *TIME Magazine* article on April 4th, 2005, things had started changing: beside games being offered as a "bonus" for the buyers of a cell phone, a new market had been born for mobile games; these could be bought separately and imported generally

3 In opposition to Sony's Walk*man* audiocassette player, Game *Boy* was clearly geared toward a preteen and teen market; in both cases a possible female population was evidently marginalized.

via the web, a market whose dimensions had become considerable. "An estimated 76% of kids ages fifteen to nineteen and 90% of people in their early twenties use their cell phones regularly for text messaging, ringtones and games" (Thottam 2005). Besides "kids" or "boys," we see a significant percentage of people over 20: a vague sign, but a sign nonetheless, of a growth in the age of users. In the ultimate terms of business, that is the volume of sales: "Gartner Research estimates that Americans spent $1.2 billion [in 2004] on ringtones, wallpaper and other 'personalization' services and an additional $1.4 billion on cell-phone games and other entertainment." (Thottam 2005). As of 2005, two years before the birth of smartphones, games were already a business in themselves, and people spent actual money to buy them.

After 2007, as the mobile phone became, in essence, a real computer—fully capable of Internet connection but also of high-quality video—and after the explosion of the market for apps, once again many observers and professional analyzers forecast a blooming market for the iPhone's use of YouTube and the like. However, data again speaks of games as the most widely downloaded apps. Let's see the data from a Nielsen report of 2011: 64% of downloaders (almost two thirds of the total) chose games; 44% (much less than half) chose music; 26% (about one fourth) videos and movies. Naturally, many people watch videos directly on their smartphones via the web without downloading specific applications, but this is also true of many forms of online playing, including gambling, which would deserve a specific study, and "social" games like Facebook-based *Farmville* and others. Naturally, we know that many of the people considered downloading games *plus* music *plus* possibly videos, but a significant portion seem to be only interested in games.

Also, we should also keep in mind that many mobile device owners who have decided to download a game do not necessarily make use of it: the abundance of *potential* games that people get on their phones but do not play is in itself an aspect of what we may call the new "casual" ludoscape. A "casual" attitude is in fact one of the main characteristics of the relation of what we can call the "*Homo ludicus* on the move" to his/her environment; and it is also tied to a specific ("casual" itself) model of business. Many of the games people download for their mobile devices (including

phones, tablets, mini-tablets, and portable computers) are free at the moment of downloading; users pay later, generally small sums, in order to "personalize" them, and/or to buy an advancement to higher "levels" if they get stuck at a point in the game. Some other games require payment at the moment of downloading, but again small sums. It is what some wise guy has defined as a "what-the-hell model of business," based on a great number of people paying a small amount of money and not caring too much for the expense.

The previously quoted 2011 Nielsen report gives us something more to think about. The average mobile gamer played an average of 7.8 hours a month. Those with iPhones tended to play around 14.7 hours each month, while those with Android smartphones played around 9.3 hours per month. A quarter of an hour a day for "normal" phones becomes half an hour for iPhone users. A "casual" habit, but definitely a habit.

These insights may be further enriched by some data from a December 2011 survey in *The Economist*.[4] At that date the single most popular game for mobile devices, Angry Birds (which in its basic version invites the player to catapult some rotund birds at rows of plump green pigs) was among the products of the cultural industry most widespread in the world with 500 million downloads. At the end of 2013 the total downloads if we consider all platforms (a great majority mobile or portable, like smartphones, tablets, mini-tablets, portable computers), are estimated to be little less than two billion, according to a January 23, 2013, article by Neil Long on *The Edge Online*. One of the implications of the explosion in the downloading and use of that kind of game is a significant change in the age/gender proportions of players compared to the earlier period, in which the most typical forms of machine-based games were consoles and computer games or mobile ones eloquently addressed to boys. According to *The Economist*, the median age of electronic game players (including both video and mobile devices) at the end of 2011 was thirty-seven, up from the prevalence of teenagers and people in their early twenties less than ten years before. Additionally, and at least as important, the proportion of females to the total of video and mobile players was 42%, up significantly from the prevalence of males in the age in which video

4 Tim Cross, "All the World's a Game," *The Economist*, December 10, 2011, http://www.economist.com/node/21541164

and computer games dominated the market.[5]. In terms of age, the change is explained by two main factors: the growing up of the "console generation" of the 1980s and '90s, and the development of a new stratum of users, from thirty to fifty and over, who have adopted casual games as a part (we may suppose) of a typically nomadic life. As to gender, it is often said in newspaper articles that possibly the majority of casual game downloaders and players are women; I have never seen convincing data to prove this assertion.

In synthesis, one of the implications of mobile media such as cell phones and tablets is, on the one hand, a new mobility of playing and on the other, the growing presence of play in human mobility, which in terms of age and of gender is crossing the traditional frontiers of pre-existent electronic ludicity. How do we explain this double phenomenon? Why people on the move play so much, why do they prefer games to other apps also offered by their mobile devices?

My thesis is that (1) the new possibilities offered by mobile technologies and the growth of an offer for mobile games have been met with a general redefinition of the anthropology of play that breaks the classic borders between play and work, a process which I term as the advent of the *Homo ludicus*; (2) this historical process has created the environment not only for more playing and for playing while on the move, but also for some peculiarities of mobile ludicity, starting from its "casual" character; and (3) in the present stage of mobile media, ludicity is not just one among many possibilities offered to women and men on the move, it is a *defining* aspect of mobile life.

3. The Ubiquity of Play

The growth of playing based on cellular technology is a part of much more general historical tendencies: the growing portion of time dedicated by a more and more copious and diverse portion of the population to various kinds of play, and the tendency of playing and games to "invade" moments of life from where

5 For instance, according to Alain et Frédéric Le Diberder's *Qui a peur des jeux vidéo?* (La Découverte: Paris, 1993), one of the early attempts to systematically study the development of video games, the percentage of female players was estimated to be no more than 10% of the total population of players.

they were generally absent. These tendencies are tied to another phenomenon: the multiplication of the forms of ludicity based on human-machine interaction, from classic video and computer games, to the multiplication of online gambling and to the web games that are "social" but also technology-centered, like or *Slotomania* or *Farmville,* to the games based on mobile and cellular technologies that are the main subject of this study.

In order to understand the growing presence of ludicity in many aspects—particularly in adult life—that were earlier rigidly separated from play and games, I have developed the concept of *Homo ludicus*, in opposition/complementarity to the classic *Homo ludens* defined in the 1930s by Johan Huizinga, a Dutch historian and one of the founders of modern cultural history. Following the studies of psychologists Lev Vygotsky and Jean Piaget[6]), while in the traditional forms of ludicity, starting at least from school age, games have to be separated from ordinary life by a more-or-less visible frame, to use Gregory Bateson's concept. We are now witnessing a growing intermixing of playfuyl and "serious" activities in many moments of daily life. While *Homo ludens* is one of the possible definitions of *Homo sapiens* in all stages of history*, Homo ludicus* is a peculiar and ongoing moment in history: it defines a species that tends to play everywhere and in many different moments of life, in a growing "grey area" between the frame. Or, in Huizinga's terms, the "magic circle" that traditionally separated play from life, and daily activities including work. *Homo ludicus* is also a species that conjugates forms of play generally defined as "grown up," from gambling to sports to the person-to-person competition in chess or cards, with other play forms that have been for centuries considered more infantile.

And *Homo ludicus* is a species that regularly and in a growing measure plays with machines, particularly with "intelligent" machines. To understand the meaning of this aspect of contemporary life, we must keep in mind that playing is generally one of the ways by which humankind adapts to new environments—in this case to a world where non-human agents are more and more present and

6 The Swiss psychologist's thought on play cannot be confined to one single book. See in particular *The Construction of Reality in the Child* (Basic Books: New York, 1954).

powerful in their lives. Playing with machines is a direct way of making them human, to absorb them with all their inhumanity into the most human of behaviors. To quote philosopher Giambattista Vico[7] in his 1725 book *New Science*, "It is typical of children to handle inanimate things and, while playing, talk to them as if they were alive," and always according to Vico, they so act as poets, for "the most sublime task of poetry is to give meaning and passion to meaningless things." Consistent with this description, by playing with machines in the age of artificial intelligence humans learn how to give but also how to get sense and passion to and from *things* that are now behaving as intelligent in themselves. The ludicization of intelligent machines and the reciprocate mechanization of human play have been part of a long historical process, of which we may find early intuitions in the eighteenth century with Jacques de Vaucanson's automata, but has become a part of daily life in the age of computers. The ludicization of machines has meant, in succession, the presence of machines as toys (which may be found also in ancient civilizations), the presence of machines as game regulators/referees (which is typical of the twentieth century), the presence of machines as toy boxes, (richer and richer with the memory potential of the machines themselves), and their presence as game partners, which is typical of the age of intelligent machines as a part of daily life—that is, of the last four decades.

A specific feature of what I call *Homo ludicus* is the growing ubiquity of play, *with* machines or *mediated by* machines. This, in turn, is strictly tied to the fragmentation of time and activities that have accompanied the growing diffusion of more and more intelligent tools for communication (and for information processing); and, more recently, to the diffusion of mobile technologies, which implies (a) the possibility of playing with machines in a growing variety of moments in life, and (b) the availability, in all moments, of machines as possible partners for play. Wherever you can take your mobile devices (almost everywhere) you can take your games, and you have a machine ready to play with you. While Huizinga's "magic circle" required its own ritualized time and space, now a more and more urbanized, deinstitutionalized, and computerized life offers in many different situations segments of time that may

7 The famous quotation is from the 27th axiom, or "degnità."

go from a few seconds to full hours, ready to be filled by play. In the place of the thick frame that great theoreticians such as Bateson (1955) or Caillois (1961) consider essential to human ludicity, we find a thinner and thinner frame that may be crossed in both directions many, many times a day. This helps us in understanding an aspect of the phenomenon described in the early paragraphs of this essay. In mobile life games characterized by a strictly defined beginning and ending are more and more substituted by games where the entering and exiting are, to a degree, defined by the occasion by the arbitrary decision of the user. Mobile media, from smartphones to tablets, make us ready to abandon play at any moment and to get back to it as the situation requires.

4. The Meaning of "Casual"

The use of games as an aspect of nomadic behavior in the age of mobile media, and the growing role of games as a possible use of mobile devices, is part of the more general historical phenomenon I have defined as the advent of the *Homo ludicus*, which makes play ubiquitous in space and surrounded by a thin frame, permeable to other activities of ordinary life. This makes games themselves more and more fragmented in time and more and more indifferent to place: the place where these games are played is now nowhere and everywhere; their time is any time: during travel, in queues, in all possible pauses in daily activities.

Nomadic games are typically ones that may be left and then resumed in every possible moment; they are typically games that do not seem to be conditioned by any specific location. So, paradoxically, while they are made possible by the end of Huizinga's traditional "magic circle" that separated the play world from the "serious one," they create their own time-space: what we might call a "magic bubble," because we can literally take our game world with us, recreate it at the touch of a finger, become immersed into it like we can with our mobile musical devices, and even more since playing requires our concentration. But at the same time mobile games help nomads to adapt themselves to the different spaces they cross. One of the possible consequences on the long term is that games may become part of the perception of places, and that perception may be integrated into the continuous semi-

ludic activity that accompanies travelers. Some apps conceived to transform mapping programs into ludic devices may be the forerunners of this tendency.

The "*Homo ludicus* on the move" not only *lives* play as a part of life but finds play in all possible corners. On the other hand, he/she may find work in all possible corners, and pass from play to work as naturally as the opposite. At least as important for the "*Homo ludicus* on the move," objects conceived as tools may become toys at the touch of a button, and those that have been used as toys may instantly become tools at the ring of a phone, or even at a sudden thought. This was not possible for portable game platforms such as the Game Boy, which was conceived and marketed as a toy (and only as a toy) since the very start. This is almost obvious for contemporary mobile devices, which are by definition versatile machines, for which the switching between "serious" and entertainment uses is as easy as the touch of a button.

Beside being independent from time and space, and being continuously "switchable" to different functions, the playful uses of mobile devices are usually defined as "casual." This is an interesting and meaningful expression that helps us to understand an important aspect of human ludicity in the age of mobile machines, and of human mobility in the age of ludic machines.

By speaking of "casual" games we imply, in fact, (1) a casual attitude of the player, for whom the game is not only non-serious as all forms of play are, but also as opposed to play being paradoxically one of the activities in life which takes a most serious attitude—as Nietzsche said in 1886, "A man's maturity consists in having found again the seriousness one had as a child, at play"—a "casual" behavior requires less concentration than playing generally does, and may even be semi-conscious like music listening in the age of "ubiquitous music" (Kassabian 2013); (2) the possibility for the player to create (for free or for a small amount of money) a vast repository of games, analogous to the possibility for the mobile music listener to create a large collection of songs (and more and more for the mobile reader to create a large library), for choices that may be themselves quite casual, and (3) the use of those games in moments that are themselves "casual," not decided in advance, without a predefined beginning or end—the biggest difference from classic games where a beginning or end is crucial to the

essence itself of playing. Even though video games are often also conceived for the player to be able to abandon the game and restart it as he/she has time. In video playing the end is one of the most essential features of all games.[8]. Casual games, on the contrary, are as unending as the nomadic behavior of their players.

For the nomadic and/or the "casual" game player, physical transition coincides with other types of transition—to-and-fro states in life that were until some decades ago conceived as rigidly separated; it uninterruptedly acquires and loses meaning according to the frames it continuously crosses. Including the transition from "serious" life to play and vice-versa. For the *Homo ludicus* on the move, we should always remember that mobile devices are at the same time toys, toy boxes, and game partners. And referees, because in games centered on intelligent machines the rules of the game inexorably become programs. The "*Homo ludicus* on the move" takes with him/herself an unending possibility for casual behavior but also rule-dictating machinery. This seems less threatening, though, because there are many possible games as there are many possible sets of norms.

On the other hand, we should keep in mind that the term "casual" is not applicable only to mobile playing, but also to other aspects of mobile behavior, from music listening to conversation itself, which is often less concentrated, more indifferent to time/space, more fragmented (and open to be recomposed in a sort of continuous montage) than the correspondent activities based on nonmobile devices. And this kind of attitude is perceived less and less as an exception, more and more as a "normal" state for game playing as for music listening, interpersonal communication, and even reading. If this is true, the study of mobile playing may help us better understand other aspects of the general anthropology of mobile behavior.

8 Many thanks to Riccardo Fassone, whose PhD thesis *Every Game Is an Island* helped me to focus on this subject.

References

Bateson, Gregory. "A Theory of Play and Fantasy." *APA Psychiatric Research Reports* 2 (1955): 39–51.

Caillois, Roger. *Man, Play, and Games*. New York: Simon & Schuster, 1961.

Fassone, Riccardo. "Every Game is an Island." PhD diss., University of Torino, October 10, 2013.

Huizinga, Johan. *Homo Ludens: A Study of the Play-Element in Culture.* Boston: Beacon Press, 1955. Originally published as *Homo ludens. Proeve eener bepaling van het spelelement der cultuur* (H.D. Tjeenk Willink, 1938).

Kassabian, Anahid. *Ubiquitous Musics: The Everyday Sounds That We Don't Always Notice*. Edited by Anahid Kassabian, Elena Boschi, and Marta Garcia Quinones. Burlington, VT: Ashgate Publishing Company, 2013

Le Diberder, Alain, and Frédéric Le Diberder. *Qui a peur de jeux video?* Paris: La Découverte, 1993.

Long, Neil, "Two Bbillion Ddownloads? We are Jjust Ggetting Sstarted, says Angry Birds Ccreator Rovio.", *The "Edge Online*,", January. 23, 2014, http://www.edge-online.com/features/two-billion-downloads-were-just-getting-started-says-angry-birds-creator-rovio/.

Nielsen Company, The. "The Mobile Media Report: State of the Media (Q3-2011)." Research report, The Nielsen Company, 2011. http://www.slideshare.net/victori98pt/state-of-mobile-q32011-by-nielsen.

Nietzsche, Friedrich. *Beyond Good and Evil: Prelude to a Philosophy of the Future*. Translated by Helen Zimmern. Mineola, NY: Dover Publications, 1997.

Ortoleva, Peppino. "Homo Ludicus. The Ubiquity of Play and its Role in Present Society." *Game: The Italian Journal of Game Studies* 1, no. 1 (2012): http://www.gamejournal.it/homo-ludicus-the-ubiquity-and-roles-of-play-in-present-society/#.Uc_2THGfl68.

Piaget, Jean. *The Construction of Reality in the Child.* New York: Basic Books, 1954.

Vygotsky, Lev S. "The Role of Play in Development." In *Mind in Society: The Development of Higher Psychological Processes*, edited by Michael Cole, Vera John-Steiner, Sylvia Scribner, and Ellen

Souberman, 92–104. Cambridge, MA: Harvard University Press, 1978.

Vico, Giambattista. *New Science.* Translated by Dave Marsh. London: Penguin Classics, 2000. Originally published as *Scienza Nuova* (1725).

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4

The New Frontiers of Mobile Media: Theoretical Insights on Their Possible Developments

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Abstract

In this paper I analyze what is emerging in the new frontiers of mobile media, where social media, global positioning systems (GPS)—including location-based services (LBS)—and mobile phones are merging. In addition, I will analyze the implications of the precious heritage that portable media might receive from the mobile phone. To substantiate my analysis, I take into account two examples: (1) the QR codes, and (2) Google Glass, both of which introduce forms of augmented reality in public spaces. Further, the conceptual framework on which both of these innovations are rooted is examined. I challenge the simple "more communication is better" idea that inspires them, and I show that this belief is wrong and that only by rejecting it will it be possible to improve these innovations. At the same time, I also stress that with these two technological inventions the lack of reflection on the role of

human body inside mediated communication continues. Finally, I discuss the possible social consequences of this indifference, as well as of the shift from mediated communication to mediated perception of reality, showing that we need to rethink the design of these technological advancements.

Keywords: mobile media, mobile phone, mediated communication, mediated perception, mediated reality, QR codes, Google Glass

The Mobile Media as Fortunate Heirs of the Mobile Phone

Current mobile media might receive a precious heritage from the mobile phone that should be a guide in the stormy sea of innovations. The first and fundamental element that they should inherit is its *ecumenism*. According to the World Bank's August 2012 report, "Information and Communications for Development 2012: Maximizing Mobile," there are six billion mobile phones whose users represent three quarters of the world's population.[1] Obviously not all these phones that are spread around the world have the sophisticated affordances I describe in this paper, and not even all the owners of smartphones make an advanced use of them, as the study carried out by Fortunati and Taipale (2014) shows. However, today smartphones have reached one billion units and thus represent a sixth of all the mobile phones existing in the world. Still, the global diffusion and adoption of the mobile phone at this extent is of a great importance, because it constitutes the framework, spread experience, and practice that allows us to speculate on a possible future generability of our analysis.

In fact, the use of mobile phones has infiltrated many spheres of social life and almost all its members, although with a different degree of sophistication (Katz and Aakhus 2002; Katz 2003; Goggin 2011; Green and Haddon 2009; Hjorth, Burgess and Richardson 2012; Hjorth 2013). Studying the mobile phone enables researchers to look at a society with the coverage of a fully open camera lens. The mobile phone has demonstrated a correspondence with what

1.http://publications.worldbank.org/index.php?main_page=product_info&products_id=24288

we would expect from any technology, such as a computer, laptop, tablet, television, radio and so on: the capacity to address the needs and the desires of every human being (Ling 2004; Ling and Donner 2009; Haddon 2004; Ling and Pedersen 2005). While the diffusion and appropriation of the computer and the Internet have always entailed problems both of digital divide (Hargittai 2002; Vehovar et al. 2006) and a slower rhythm of this by people, the mobile phone has had, if anything, the opposite effect—the capacity to digitally unite individuals within their small circles (Ling et al. forthcoming) and small communities. The capacity of mobile phones to be present everywhere in society and to unite people makes the studies on mobile communication transversal to all the spheres and the dimensions of our society. The device is in effect a window from which to look at everyday life with great scope.

The second element that contemporary mobile media should inherit from the mobile phone is its great ability to expand all over the world in a very short period of time (Harris and Vincent 2008). In other words, this is its *speed of propagation and adoption* by people of any language, culture, race, and geographical collocation, something no other technology has ever achieved.

The third element of heritage should be the portable phone's capability to be *global*. The locality of the traffic in which mobile calls and SMS messages are confined does not impede the gadget's potentiality to network people from all around the world by means of social media and Internet access. And, in any case, the imagination that actually accompanies this device in its routes of diffusion and use around the world is also global. For the same reason, the idea that it is possible, through GSM technology, to communicate with people everywhere is sufficient for shaping the perception of this technology as a global device—although the reality of things would instead suggest to speak, at the maximum, of a global technology (Fortunati 2005). This conceptualization of the mobile phone as global echoes Georg Simmel's 1903 analysis of the metropolis life, where he argues that the added value for people living in a big cities is the concept of accumulation—the idea of having, for example, a large amount of cultural events from which to choose. This view, continues Simmel, is sufficient to make people feel as if they were in a culturally rich situation, although

in practice they may not profit very much from this rich offer for other reasons such as long distances, traffic congestion, and so on.

The challenge for mobile media—smartphones in the first—is to try to embody the main characteristics of the father, the mobile phone: ecumenism, speed of adoption, and globality. In this extraordinary, effervescent moment regarding innovations, the mobile media, rooted on mobile phone affordances, are candidates to succeed more than other new advancements. The technological development of the mobile phone on which I focus here regards, at the moment, only a part of the population that owns a device. And it is the part that not only can count on the sophisticated smartphones, the multimodal devices equipped by global positioning systems (GPS), but also that enjoys an advanced use of them.

Locative, networked, and social are the three key words that describe contemporary mobile media. Here I develop my analysis by focusing on two different technologies that allow access to augmented reality: one is QR (Quick Response) codes that are readable by a particular application of smartphones, and the other is Google Glass. By analyzing these two examples of top-down innovations, I try to investigate on a theoretical level what is emerging in the new frontiers of mobile media, which now conveys some pieces of augmented reality.

The Two Examples

A QR (Quick Response) code is a two-dimensional barcode, or matrix, consisting of black modules arranged within a square pattern, meant to be read by smartphones through special applications. Thanks to the use of the camera, the phone is able to scan their content. By positioning the mobile phone over the QR code it is possible to access written, audio and/or video information or a website where additional information is available on a specific topic. These codes have enormous diffusion all around the world and are allowing access to augmented reality in print items such newspapers, posters, advertising, tickets, and so on. Invented around twenty years ago, they were used as a tool to trace the car pieces in Toyota industries; now, they are being employed for quite different reasons, as often happens in the world of technologies.

Their applications are varied and today they can be found in different environments, such as on posters for an event (where they can, for example, link to a Facebook page), in museums and exhibitions alongside paintings and statues, on advertising billboards (where they link to a page with the specifications of the advertised product or sometimes the possibility to buy the product), on coupons (where they allow people to receive some discount), on business cards (where they contain the link to the firm or personal website), on the public or commercial transportation (where they allow, for example, access to the timetable or act as a material ticket, bought online). They are typically used to provide a link to some digital content and for this reason they can be considered, in combination with the mobile phone, the ideal bridge between the print and the online world. On the diffusion and conceptualization of QR codes two research projects were carried out: a structured online survey administered in Italy between January 4th and May 6th, 2013, and the collection of nearly twenty essays written on this topic by the master students in my course on Theories and Techniques of New Media and Information Technology. The online survey collected 845 questionnaires from a convenient sample of respondents, and shows that the information about QR codes and their use is increasing. These two research projects are presented and discussed in detail in the paper "Shifting the Debate: From the Future of the Press to the Press of the Future" (forthcoming). They can also be considered, in combination with smartphones, as the first technology applied to reading. The research done so far on writing/reading in print and digitally has shown that while writing has undertaken a clear process of technologization, reading has remained pre-technological (Fortunati and Vincent 2014). Audiences need to overcome this pretechnological state and learn to introduce in the reading process new tools, such as QR codes combined with smartphones to include the digital into the print press, or special pens capable of transferring, if needed, print papers into the digital world.

A particular use of QR codes is related to the press world. The *Wall Street Journal* in the US and *La Repubblica* or *Panorama* in Italy (just to name two out of many) have begun to use these codes. In the *Wall Street Journal,* at the end of an article you can find a QR code with a suggestion such as, "Scan this code for a video about

the article or watch at WSJ.com/OffTheWall." These codes can increasingly be found in newspaper or magazine articles, bringing the reader to the online version of the article or to a website with photos, videos, or audio recordings of the event reported there, allowing the readership to access a variety of content that would be impossible for a print newspaper to offer. This kind of real-time reporting might be an opportunity for the print newspaper that suffers from the fossilization of the news reported in its pages. This code, with the mediation of the mobile phone, can then act as a bridge between a static media (like a print newspaper) and a dynamic media (such as Web 2.0), where the reader can be provided with other types of resources or with the updating of the news read in the print newspapers. When the readers are online, it is then easy to post some comments on the subject or recur to the mechanisms of sharing and liking connected to the various social platforms; all those operations would be impossible in the static, print newspaper, except in the verbal form and only with people around the reader. Through QR codes and the mobile phone, the readership of print newspapers can bring the advantages of the Web and the social by respecting the integrity of the print newspaper. Thus, the codes present themselves at the moment as the privileged link between print and digital. They also have the possibility of be personalized by the users, since they contain redundant surface information that can be modified by 30%.

Google Glass is an innovation that gives its own interpretation to the peregrination of the technologies on the human body and inside the vestimentary order of fashion. This technology comes from three lines of research. The first line is made of the studies on fashion and technology (Fortunati 2005) and the second one comes out from the research carried out by the Intelligence Services. It is amazing to go to the Spy Museum of Washington and see the age of some technologies that have become revitalized (of course for other purposes) by research and development departments in the fashion industry. In the fifties the Bulgarian Intelligence Services, for example, had already realized the idea to hide some technology in the hills. The third line is the experience of augmented reality: the glove is gone, the glasses have remained.

Google Glass instead focuses on the eyes; this is not a new concept. For many years, some enterprises have been working on the

idea of equipping regular glasses with a mobile phone. The notion was raised in the fashion world and the project had the purpose of augmenting the value of glasses as a fashion and communication item at the same time. Google Glass, which is a more sophisticated and powerful tool if compared with the previous example, claims to convey "useful" information during our routes of mobility. We are already in a situation of information overload (Harper 2010); do we need more? How much more useful can this data be? And who will decide what is the right information for us to receive? On what criteria? Will users be able to influence and enter on the design process of this innovation? Will user communities be involved in this process of discussion and decision?

We are not yet able to answer to these questions because Google Glass is still under the designing process. But it can be said that this innovation represents a radical change of paradigm in user relationship with ICT enterprises. While once, the "advanced users" who collaborated, starting from the concept phase, with Telecoms and Operators for co-constructing new technologies were paid for their work and time, now the small group of selected and "fortunate" users are obliged to pay $1,500 to test Google Glass. Furthermore, in the project, people who purchase Google Glass are unable to keep it after the purchase: they are able to buy only a service. In fact they cannot resell, lend, or transfer the glasses, otherwise the service will be deactivated. The same happens with the e-books: one cannot buy the e-book, only the licence to read it. This change of paradigm deserves some considerations; two closely connected strategies are applied here. The first has been called "putting consumers to work" (Zwick, Bonsu, and Darmody 2008; Arvidsson 2005, 2008; Katz, personal communication) and is an old marketing strategy which is now also applied in the field of ICT innovations. The second is a more recent strategy coming from the publishing world (e-books) and now transmigrating to the ICT world. It consists in the reorientation of user identity, whereby the user is not anymore conceived as owner, but just as temporary user with limited rights on the possession (and hence the use) of the technological artifact. In past diffusion and appropriation of ICTs the fundamental point was the fact that users could become the owners of computers, mobile phones, etc., and this gave to users the full (within certain limits) capacity to do what they wanted

with the piece. Of course, as Zwick and Dholakia (2008, 323) have stressed, this ownership, although important, was also in the past limited by the fact that the single technological terminal is not a means of production anymore, but instead the platform (or brand) on which individuals with computers, mobile phones, and so on, act. But the vanishing of every property in the hands of people means the further development of the dematerialization of everyday life and consequently the definite disempowerment of users. If people progressively do not possess what they buy there will be a possible reduction of their civil rights.

The Theoretical Framework of these Two Innovations

These cases study push us to reflect on the conceptual framework that sustains them. Two main points should be raised. The first is the fact that both these technologies are rooted in a simple vision: the more communication there is, the better it is. Although Richard Harper's book *Texture* (2010) has shown that this idea is something that we must abandon for more innovative and dynamic visions; both QR codes and Google Glass continue to be inside this vision. The conceptual mistake is that they treat communication as a good that it is better to have at the highest levels. But communication is instead a process that has another social logic, and this logic requires that in every situation the important thing is to understand the amount of correspondence which is necessary. The true problem of communication is the establishment of its right measure, not the automatic increase of it. For this reason, for example, the strategy with which QR codes are used in the print newspapers is wrong since it consists only in adding information, while one knows that the readership dedicates on average only few minutes a day to newspaper reading. Furthermore, if we read the research done on audience behaviors in the websites of online newspapers we find that people do not exploit the affordances of Web 2.0, simply because they do not have time (Fortunati et al. 2009). The success of Vine is the shortness of its videos.

Another thing one knows is that, given that the practices of use of the various tools of communication and information are not segregated inside the social body, there is a certain circularity of

these practices in the audiences. Starting from the awareness of the modalities of newspaper reading and of the circularity of the practices of use of ICT, in order to activate QR codes in a more efficient way we should use them for updating the news, offering the possibility of post comments, introducing the mechanisms of sharing and liking articles, or for offering summaries of the articles. Or, as proposed by Richard Chalfen in a personal communication to me, for offering translations of the main articles in the print newspaper in order to reach a broader, international readership. In this way it will be possible to bring the advantages of the Internet and the social to the print. On the contrary, the strategy with which QR codes are used in the print books is right, because here it does make sense to add visual or audio information to that reported in the text. Further, Google Glass proposes the addition of more information. But here there is the attempt to realize this by reorganizing and re-engineering the information related to different spheres of our life and merging them with the information coming from classical news genres, in addition to writing this information on our vision and perception of reality. I will come back to this issue later.

The second point is that in the design of both these new technologies the human body continues to be neglected and becomes even more marginal in comparison with the classical mediated communication, where it always represented a serious problem. In fact, traditional media (computer and mobile phone included) in the communication sphere have always enhanced the alienation and separation of the body from the communication of emotion, words from nonverbal signals, as Longo (2003) argues. The mediation of artificial transformers (such as the mobile phone and the Internet) has accentuated the historical separation between the body, the personal, and the social capacity of individuals to communicate. This aspect of alienation was inevitable since the historical rupture of the unit between mind and body, and consequently the separate development of the mind from the body (Fortunati, Katz, and Riccini 2003), was further developed in the last century. In particular, the separation carried out by ICTs between the body and the mind in the communication process has had relevant effects on what is concerned here, since "in the mediated communication process the mind has always had more

chances than the body to be the protagonist" (Fortunati 2013, 117). As Manovich (2001) stresses, the most important point of tele-presence is not in the individual's presence through ICTs, but in their absence through ICTs (antipresence). In fact it is no longer necessary to be physically present in a certain place to affect the surrounding reality. The tele-absence of the body confines it not only to a kind of secondary role in mediated communication but also to a condition of minority. Its affordances, needs, and desires tend to be ignored (Longo 2003). With the advent of tele-absence of the body, the "physical and emotional infrastructures of the communicative process become residual" (Fortunati 2013, 118). However, emotions, for their specific essence of inner energy that simultaneously implicates cognition, affect, evaluation, and motivation (Illouz 2007), have adapted themselves to mediated communication in various ways and their separation from the body did not automatically imply that individuals in a mediated context are destined to live them in a worse way. On the contrary, the physical infrastructure of the body has expressed more inertia towards the mediatization of the communication sphere. With mediated communication, the destiny of the body has always been to *be ignored in its potency and peculiarities and to be treated as in absentia*. It is expected to be steady, often sitting down on a chair, affected by health problems, especially some parts of it such as the neck, the arm, and the wrist, which are the candidates for having the most pain. Anyway, in all the forms of mediated communication, the script of the body is reduced to microgestures, often to wrong postures, and to the use of only two senses (mainly sight and hearing, besides the voice). This limited use of the body could not help but distort seriously the communication process, although as Morris (1992) argues, sight continues to be the most important sense. Despite all our talking and listening, we remain essentially visual animals. The limited use of senses becomes critical when we examine emotions which, although linked to social and cultural contexts and shared norms, remain fundamentally "body matters" (Frijda 1986; Vincent and Fortunati 2009).

It is sad to see that the inertia of a tradition of research on information and communication technologies regarding the role of the human body influences also the new technologies—in particular, Google Glass. With Google Glass the body is even more

residual and marginal; hence we would give up to take into account the contribution of the intelligence itself of the body.

Possible Social Consequences: From Mediated Communication to Mediated Perception of Reality

My idea is that, among the two innovations here considered, Google Glass especially could entail as possible social consequence a shift from mediated communication to mediated perception of reality. The old new media had already caused a disturbance in the perception of our interlocutor. But this disturbance was immediately focused on the technology and on what the technology was conveying, without substantially altering the environment around it. With Google Glass it is not sufficient to talk of disturbance; one should instead talk of a true shift from mediated communication to mediated perception. When Google Glass explorers walk, information can flow in front of their eyes about the friends who might be walking near them, or about the restaurants and the shops which are close to them. This possibility can transform the passersby from *flanêurs* ("loafers") to "informed" passersby, with the effect that the serendipity might disappear from mobility. A different modality involves the reading of QR codes by means of a smartphone. In this case the passersby can decide to access augmented reality when she/he likes. The access here seems less invasive than in the case of Google Glass, because there is not a reworking or a centralization of the information about people's behavior and localization. Here the access to information is simpler, in the sense that QR codes function simply as a bridge between the print and the online. But is this information anything that users really need or ask or are interested in?[2] Not to mention the fact that this shift ends up disturbing perception since our attention is readdressed towards communication and representation. This is a further degree of the expansion of the filters system which, in our society, has entailed the reduction of firsthand living experience. Getting continuous information that overlaps the immediate perception of reality ends up disrupting perception. Our attention is readdressed towards communication instead of perception. But

2 In the cited research 66.6% of the respondents argue that QR codes are useful (Olivotto 2013).

this process means at the same time there is now an increasing competition between these two in which the latter's risks are the worst.

What happens when perception becomes mediated perception, when it begins to be substituted by communication and representation? And what are the social and personal consequences of it? The perception is the psychic process that operates the synthesis of sensorial data by attributing a meaning to them. The problem can be analyzed with the help of Bergson who, in his book *Matter and Memory* (1896), tries to understand the relationship between memory, recollection, and perception. To realize itself, memory needs the mechanisms connected to the body. In fact the perception is, as Bergson points out, the possible action of our body on other bodies (although it is independent from the body itself). With this definition he means that perception does not have a merely cognitive function but also especially a practical and operational function, since perceiving entails the modification of the material reality on the basis of the needs of our body. The body plays a central role in perception, understood both as sensation (which is connected to the immediate effects of the physical contact of sensorial receptors with the signals coming from outside), and the true perception (which is connected with the organization of sensorial data, that is with the outcome of the elaboration process of sensorial information by the whole human body). If mediated communication has represented the neglecting of the physical and emotional infrastructures of the human body inside mediate communication, what happens to the body with the new innovations? If the perception becomes largely mediated, this means that our *perception will deteriorate* because the body will become even more secondary than it was inside mediated communication. The immediate experience of the human body is, in fact, fundamental in the elaboration of perceptions. Of course, when the experience of reality becomes mediated the perception is inevitable disturbed. If this process of mediation, instead of being focused on one technology, is expanded to cover the entire reality (as in the case of the Google Glass), the perception risks being underused, biased, and will produce more mistakes than usual in the elaboration of reality.

Are We Going towards a Mobile-Mediated Reality?

We are used to talking about augmented reality to indicate how, by means of new technologies, one is able to go through paths that lead to enlarging and capturing other dimensions or situations by expanding the relationship with the reality one is living. But again, this vision is supported by a poor knowledge of how communication functions in society. In fact, these innovations (such as Google Glass) not only consider, as we said, that the more communication you have the better it is, but also consider communication itself linear. On the contrary, societies have organized their communication strategies in a much more sophisticated way: many different types of communications such as formal and informal, intimate and official, evident or underlying take place. Furthermore, not all is said in a society: we have taboo arguments, euphemisms to express what we do not want to say, or, on the other hand, we have lapses ("Freudian slips") when we mistakenly say what our conscious would not want to, but that our unconscious forces us to reveal. But apart from what is omitted even in the interpersonal relationships, there is also a dynamic between truth and fiction that belongs to the reality of social relations. Of course a society must tend to the truth—otherwise the authenticity of human relationships would not work. In this tendency, however, there is room for many strategies of negotiation between truth and the various types of lies that people tell. Many lies defend our own privacy. And, in fact, talking of privacy means talking of the management of all these important aspects of social life. Coming back to Simmel (1900) and adding also Goffmann (1959) in the conversation, they argued that we need to limit our communication to maintain good relationships. In other words, we need to control the amount of information in order to make society. Overinforming others can be problematic, not more helpful. The same happens when we get underinformed: it can be troublesome and stressful.

The same analysis can be applied to reality and the balance that must exist between mediated reality and firsthand reality. There must be a balance among them because if we lean too far towards mediated reality we becomes very isolated and our body becomes increasingly a secondary appendix of our cognitive and

experiential processes. There is a truth in firsthand reality that lacks in the mediated and this truth lies in the opening of the vision we experience.

Augmented reality is a technical possibility. Will the society be interested in adopting this possibility to a great extent? As always we could be interested to know what our friends and dear ones do, but maybe we do not want them to know where we are or what we are doing. This is not only because we want to be the jealous depositaries of our movements and behavior but also because we live in a structure of social roles that, in order to function, need to maintain separated the various spheres of social life (Simmel 1908). This need comes from the fact that every role entails specific skills and tasks and also different levels of informality. For example, what happens if through the Google Glass we come to know that our partner, who told us that she or he was at work, is instead having a lunch with our best friend in a restaurant near where we are passing? There are so many important elements of social life that can be put in crisis by this "innocent" technology, and this can be a shocking discovery that creates problems for people. Sometimes we need to approach reality in a delicate way, conveyed by the copresence of our partner and by a direct conversation. Moreover, in a relationship both partners need to talk sometimes and not other times about every single action they do.

And what about the defense of privacy as one of the inalienable rights of our society? How many degrees of freedom could we loose from the diffusion of this technology? How many degrees of control over our lives do we lose accessing the augmented reality proposed by Google Glass? These two words—privacy and control—put at stake the questions of citizenship and power. Societies have already entrained a strong process of change in the last two decades in respect to these important elements of the social life. The mobile phone at the beginning and social networks in a second moment have already redescribed the relationship between privacy and public and between control and freedom. We are in a kind of "work-in-progress" with the new definitions that are coming from the crash of these dimensions that so far were opposite, and we are also in the process of their social regulation. We talk of public intimacy, of individuals, and of consequent empowerment of citizens, for example, but these new modalities of reorganization

of mediated sociability and communication are in a crucial phase of transformation.

Not only communication and sociability have been put under change by the emergence of these new innovations. QR codes and Google Glass have the potential to also transform the urban environment and mobility. The walls of the city are increasingly full of this kind of encrypted language. The city will acquire more transparency and a more advanced information and communication capability. On the other hand, the mobility will become a less spontaneous and immediate process, and will entail communication strategies before facing urban environments. The use of these two technologies in perspective may change many things. For example, the city will become a talking body, not one that preserves its mysteries. Also, mobility could be reshaped; as I already mentioned, the dimension of serendipity might disappear and give room to a notion of informed and networked mobility. This possibility might transform the passersby from *flanêurs* to a kind of "informed" passersby. This shift in the metaphors that can describe the dwellers is also a shift in the meaning and ritualization of their role. Behind this operation there is a strong rationalization of the communication system in which we are networked.

Conclusion

From this analysis it emerges that if our society, through these new technological innovations, will shift to mediated perception, humankind will have to deal with a deterioration of the quality of their perception and a worsening of the attention. In fact, there cannot be a good perception without an awareness of the crucial role played by the body. The body that was already marginalized in mediated communication will become even more marginalized with the massive access to augmented reality; this also means not only a deteriorated perception but also a deteriorated memorization. In this sense the consequence of all this risks leading to the disempowerment of users.

References

Arvidsson, Adam. "Brands: A Critical Perspective." *Journal of Consumer Culture* 5 (2005): 235–58.

———. "The Ethical Economy of Consumer Coproduction." *Journal of Macromarketing* 28 (2008): 326–38.

Bergson, Henry. *Matière et mémoire.* Paris: Félix Alcan, 1896. Translated by Nancy David Paul and W. Scott Palmer as *Matter and Memory* (London: George Allen and Unwin, 1911).

———, James E. Katz, and Raimonda Riccini, eds. *Mediating the Human Body: Technology, Communication and Fashion.* Mahwah: Erlbaum, 2003.

———. "The Mobile Phone between Local and Global." In *A Sense of Place. The Global and the Local in Mobile Communication*, edited by Kristof Nyiri, 61–70. Vienna: Passagen Verlag, 2005.

———. "Mobile Phones and Fashion and in Post-Modernity." *Telektronikk*, 3–4 (2005): 35–48.

———, Mauro Sarrica, Aukse Balcytiene, Halliki Harro-Loit, Phil Macgregor, Naya Roussou, Ramón Salaverría, et al. "The Influence of the Internet on European Journalism." *Journal of Computer-Mediated Communication* 14 (2009): 928–63. doi:10.1111/j.1083-6101.2009.01476.x.

Fortunati, Leopoldina. "The Human Body, Communication, and the New Media." In *Corps et Technologies. Penser l'hybridité*, edited by Nathalie Grandjean and Claire Lobet-Maris, 111–30. Bruxelles: Peter Lang, 2013.

Fortunati, Leopoldina, and Jane Vincent. "Sociological Insights on the Comparison of Writing/Reading on Paper with Writing/Reading Digitally." *Telematics and Informatics* 1 (2014): 39–51. doi:10.1016/j.tele.2013.02.005.

———, and Sakari Taipale. "The Advanced Use of Mobile Phones in Five European Countries." *British Journal of Sociology* (2014). Doi: 10.1111/1468-4446.12075.

———. "Shifting the Debate: From the Future of the Press to the Press of the Future." Keynote presentation at the V International Congress on Cyberjournalism and Web 2.0, Bilbao, November 2013.

Frijda, Nico H. *The Emotions.* Cambridge: Cambridge University Press, 1986.

Goffman, Erving. *The Presentation of Self in Everyday Life*. Garden City: Doubleday, 1959.

Goggin, Gerard. *Global Mobile Media*. New York: Routledge, 2011.

Green, Nicola, and Leslie Haddon. *Mobile Communication: An Introduction to New Media*. Oxford: Berg, 2009.

Haddon, Leslie. *Information and Communication Technologies in Everyday Life: A Concise Introduction and Research Guide*. Oxford: Berg, 2004.

Hargittai, Eszter. "Second-Level Digital Divide: Differences in People's Online Skills." *First Monday* 7 (2002).

Harper, Richard. *Texture: Human Expression in the Age of Communications Overload*. Cambridge, MA: MIT Press, 2010.

Harris, Lisa, and Jane Vincent. "Effective Use of Mobile Communications in E-Government: How Do We Reach the Tipping Point?" *Information, Communication and Society* 11 (2008): 395–413.

Hjorth, Larissa, Jean Burgess, and Ingrid Richardson, eds. *Studying Mobile Media: Cultural Technologies, Mobile Communication, and the iPhone*. New York: Routledge, 2012.

———. "Relocating the Mobile: A Case study of Locative Media in Seoul, South Korea." *Convergence: The International Journal of Research into New Media Technologies* 19 (2013): 237–49.

Illouz, Eva. *Cold Intimacies. The Making of Emotional Capitalism.* Cambridge: Polity Press, 2007.

Katz, James E., and Mark Aakhus, eds. *Perpetual Contact: Mobile Communication, Private Talk, Public Performance*. Cambridge: Cambridge University Press, 2002

———, ed. *Machines that Become Us*. New Brunswick: Transaction, 2003.

Licoppe, Christian, and Zbigniew Smoreda. "Rhythms and Ties: Towards a Pragmatics of Technologically-Mediated Sociability." In *Computers, Phones and the Internet. Domesticating Information Technologies*, edited by Robert Kraut, Malcom Brynin and Sara Kiesler, 296–314. Oxford: Oxford University Press, 2005.

Ling, Rich. *The Mobile Connection: The Cell Phone's Impact on Society.* San Francisco: Morgan Kaufmann, 2004.

——— and Per E. Pedersen, eds. *Mobile Communication and the Re-Negotiation of the Social Sphere.* London: Springer, 2005.

———, and Jonathan Donner. *Mobile Phones and Mobile Communication*. Cambridge: Polity Press, 2009.

———, Johannes Bjelland, Pål Roe Sundsøy, and Scott Campbell. "Small Circles: Mobile Telephony and the Cultivation of the Private." Forthcoming.

Longo, Pino O. "Body and Technology: Continuity or Discontinuity?" In *Mediating the Human Body. Technology, Communication and Fashion*, edited by Leopoldina Fortunati, James E. Katz, and Raimonda Riccini, 23–30. Mahwah, NJ: Erlbaum, 2003.

Manovich, Lev. *The Language of New Media*. Cambridge, MA: MIT Press, 2001.

Morris, Desmond. *Il nostro corpo: Anatomia, Evoluzione, Linguaggio.* Milan: Mondatori, 1992.

Olivotto, Roberto. "QR Codes analisi e sviluppi futuri." Thesis, University of Udine, 2013.

Simmel, Georg. *Sociologia*. Translated by C. Tommasi. Turin: Edizioni di Comunità, 1998. Originally published as *Soziologie. Untersuchungen über die Formen der Vergesellscaftung*. (Liepzig: Duncker and Humbolt, 1908).

———. "The Metropolis and Mental Life." In *Readings in Social Theory: The Classic Tradition to Post-Modernism*, 3rd ed., edited by James Farganis, 149–157. New York: McGraw Hill, 2000. First published as "Die Großstädte und das Geistesleben." In *Das Individuum und die Freiheit. Essais*, 192–204. Berlin: Wagenbach Klaus GmbH, 1903.

Vehovar, Vasja, Pavle Sicheri, Tobias Hüsing, and Vesna Dolničar. "Methodological Challenges of Digital Divide Measurements." *The Information Society* 22 (2006): 279–90.

Vincent, Jane, and Leopoldina Fortunati, eds. *Electronic Emotion: The Mediation of Emotion via Information and Communication Technologies*. Oxford: Peter Lang, 2009.

———. "Living with Mobile Phones." In *Mobile Media and the Change of Everyday,* edited by Joachim Hoflich, Georg F. Kircher, Christine Linke, and Isabel Schlote, 155–70. Berlin: Peter Lang, 2010.

Zwick, Detlev, Samuel K. Bonsu, and Aron Darmody. "Putting Consumers to Work: 'Co-Creation' and New Marketing Govern-Mentality." *Journal of Consumer Culture* 8 (2008): 163–96.

———, and Nikhilesh Dholakia. "Infotransformation of

Markets: Introduction to the Special Issue on Marketing and Information Technology." *Journal of Micromarketing* 28 (2008): 318–25.

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5

The Relationship is the Medium: Understanding Media in a Mobile Age

by

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1. Introduction

The approach to mobile media has traditionally involved two different and often disconnected views: a sociological take that focuses on the impact of emerging mobile media in social interactions, identities, and spaces; and a techno-economic view that privileges the role of new technologies in the supply of contents and services. However, from the perspective of cultural consumption studies, these are not separate spheres: they involve codependent processes that contribute to the shaping of both the social uses and meanings of mobile media and the nature of media industries in a socially ubiquitous information environment.

In this paper we intend to explore the existing links between these two spheres. In order to do that, we propose an interdisciplinary, conceptual framework that clarifies the disruptive nature of mobile media at the convergence of three evolutionary trends in the digital ecosystem:

(a) The centrality of digital content distribution in the evolution of mainstream digital companies (as a counterpart to the "adapt-or-perish" dilemma of legacy media in an increasingly mobile digital environment),

(b) The relevant role that digital and mobile contents play in the new consumption rituals evolving around the networked performance of identity, and

(c) The increasing importance of personal information management (profiles) as an economic asset in the context of a ubiquitous Internet, and its implications for media and content industries, fostering new business models, new content formats and new forms of relating to audiences.

The arguments in this paper are built upon the results of a four-year research project on the evolution of mobile contents (2009–2013), which involved a comprehensive literature review, as well as fieldwork with mobile ecosystem players consisting of: two series of focus groups and in-depth interviews with smartphone and tablet users and with application and software developers; a set of expert panels with telecom operators, handset suppliers, operative system developers, content aggregators, and media industry content producers; and a structural analysis of content-oriented mobile applications. However, rather than presenting an empirical analysis

on concrete aspects, this paper attempts to pose a theoretical base that would help us understand how the drifting mobile ecosystem matches the evolution of content industries and related cultural consumption practices.

Our first argument (Section 2) concerns the central role content distribution strategies are playing in how the mobile ecosystem is evolving. The relevance of content-related strategies is explained in Section 3 with regard to the consolidation of personal data management as an increasingly important economic asset. Section 4 describes how the ubiquity of personal information contributes to transform the digital content value chain (i.e., the process through which media and audiences create economic value around cultural content). However, none of these processes would successfully evolve without a concurrent sociocultural change in the very conception of content and in the social rituals attached to it. Consequently, Sections 5 and 6 explore the interconnection between key aspects of mobile media social use: (a) the transition towards an intervention-oriented idea of content (which is to say, to the fact that users can *do* things with content), (b) the integration of cultural content as a *language* or *medium* in social interactions (content-mediated identity practices), and (c) the consolidation of mobile social interactions as an object of cultural consumption. Conclusions address the complementary nature of these two processes: mobile media consumption driven by identity presentation and social interaction on one side, and the increasing importance of ubiquitous digital content as a source for the economic exploitation of personal information on the other.

2. A Clash of Ecosystems

The consolidation of mobile communication technologies has given rise to an entirely new ecosystem in our digital media landscape. The mobile ecosystem involves a complex and changing set of players (including telecom operators, handset suppliers, software developers, content aggregators, content producers, new advertising players, and users) that are becoming increasingly influential in the sphere of media and content industries.

The mobile ecosystem has evolved over the last six years from a network-centered structure, in which telecom operators had a

privileged position, to a platform-centered structure, in which software developers (especially OS suppliers) influence the relations amongst different mobile players. In this process of platformization (Ballon 2009) the main players tend to bring together all the roles required to assemble a joint set of hardware, software, and other techno-economic specifications (Feijóo et al. 2012). Apple's iOS and Google's Android are examples of dominant mobile platforms. In an OS-based structure, both integrate different roles, services, and products that allow users to access the mobile information environment: hardware (device specifications), access software (user interface), networks (mobile telecomm operators), distribution (applications and content stores), billing systems and third party environments (like specific Software Development Kits—SDKs—and application publishing systems). Eventually, mobile platforms include different added value services, such as cloud storage (Apple's iCloud or Google Drive, for instance), multi-device cloud-based synchronization, or mobile specific advertising platforms (like Apple's iAd or Google's AdMob).

This process of platformization is not limited to the mobile environment. It is part of what Steve Jobs named the "post-PC era" in which mobile computing acquires a new operative meaning. Beyond simplistic statements on the death of PC, the term is useful to address recent changes in software and hardware industries, where small, fast, and portable personal devices devoted to consumption and social interaction are taking over instead of older complex, polyvalent, productivity-oriented hardware and software forms (Manjoo 2012). Application stores, acting as the front of mobile platforms, for example, constitute a whole model that is being exported to other media environments, such as connected TV, game consoles, and photo cameras. In this respect, mobile technology introduces key aspects such as personalization, integration, and ubiquity—in other words, mobile platforms perform a decisive role in integrating information environments into ubiquitous and personalized access, fostering multidevice and multipurpose coordination of actions in different contexts (searching, buying, accessing entertainment, self-expressing, socializing, accomplishing specific tasks, etc.) (Google and Ipsos 2012). The development of wearable devices—such as Google Glass—seems to be a natural result from that process.

The relevance of OS developer-based mobile platforms lies in their success in implementing distribution channels and controlling users' access to services and content, which used to be the main asset of legacy media in the pre-Internet era. Application stores are the window through which content providers and app developers can access users. They also provide the tools for content and service discovery. Application stores play a crucial role not only in shaping the market, but also in determining users' perception of, and access routines to, mobile information (Feijóo et al. 2012). Consequently, mobile applications have become the prevalent user interface in the mobile Internet (Khalaf 2013).

Mobile technology's capacity to personalize and provide end users with direct access has also facilitated a de-intermediation process in cultural consumption. The very same channels and tools that allow content producers (legacy media among them) to reach mobile consumers favor also the transformation of content production into an object of cultural consumption. The iBook Store or iTunes (not to mention Amazon Store or Google Play) thus become not only repositories for the products and services of legacy or new digital content industries, but also a direct platform through which professional and amateur content producers (writers, musicians, photographers, software developers, etc.) can directly access their audiences without depending on traditional, oversized, cost-increasing cultural intermediaries.

This de-intermediation strategy enabled by mobile platforms is part of a re-intermediation process through which mobile platforms take over from traditional cultural industries as content consumption intermediaries. Their success in controlling digital distribution channels and shaping content discovery, access, and management in an increasingly cross-device environment is well illustrated by one simple fact: in 2012, the yearly income of Apple's iTunes and App Store (both for iPhones and iPads) exceeded in USD 300 million the combined turnover of The New York Times, Simon & Schuster (the publisher of the bestselling *Steve Jobs* biography), Warner Bros. film studios (with its billion dollar-worth film franchises such as Batman or Harry Potter), and Time Inc (Lee 2012).

3. Mobile Ecosystem, Cultural Content and Personal Information

Despite having substantially different business models, all of the big Internet companies—especially the so-called Internet Fantastic Four: Apple, Google, Amazon, and Facebook—have evolved in the last few years in a double direction: they have become more mobile-centered companies while also stressing content aggregation and distribution (Manjoo 2012). The central role cultural content plays in an e-commerce giant like Amazon needs no explanation. However, the convergence of the other Internet giants, with such different core business areas as hardware (Apple), search engines (Google) or social networks (Facebook), may well deserve a deeper look (see table 1).

The first thing these four companies manifestly share is an effort to become the center of a multiscreen platform, with mobile devices (smartphones and tablets) at its center, but also including connected TV, desktop computers, and game consoles in various degrees. Amazon, for example, has developed a threefold strategy consisting of providing a low-price piece of hardware (Kindle Fire), an integrated distribution channel that complements an Internet e-commerce portal (Amazon Appstore), and multiscreen content access (Amazon Instant Video and Amazon Game Studio), thus building a platform-like structure upon a tailored version of Android OS. Facebook, in turn, has adopted the shape of a platform-nested environment both in PC and mobile devices, providing platform-like added services such as search functions, an application store, or content access (movies, games, etc.) under the umbrella of users' social ties.

When interviewed, experts have emphasized that the reason for this strategic convergence on cultural content lies in the increasing importance of personal information in cross-device platforms. Data mining about users has become a key aspect of Internet service companies: processing personal information and profiles facilitates enhancing segmentation and adapting both advertising (Google and Facebook) and content supply (Amazon and Apple) to user profile and context (Manjoo 2012). Information about user profiles and user behavior is not only the basis for adaptive services in a context-addressed ubiquitous information environment. It is,

at the same time, the main asset underpinning business models based on large-scale selling or advertising (see table 1), including content distribution. Google, for instance, acquired Behavio, a company that specialized in monitoring mobile devices' activity (location, movement, proximity, app activity, etc.) and forecasting behavioral patterns, in 2013. Facebook's strategy—integrating apps, search, browsing, contacts, and social networks in Facebook Home—is also addressed to setting up an access ground to user behavior without depending on the filters of other platforms (like iOS or Android).

	APPLE	GOOGLE	AMAZON	FACEBOOK
CORE BUSINESS	Hardware	Search / Information	eCommerce	Social Networks
BUSINESS MODEL	Hardware and components deployment	Advertising	Content distribution	Advertising
EXPANSION	Content distribution	Content distribution	Hardware	Content distribution
CORE ASSET	User profiles	User profiles	User profiles	User profiles

Table 1: Mobile platform business model convergence on content distribution. Source: Elaborated by the authors.

Cultural content (entertainment, news, advertising, etc.) is a core element in everyday mobile activity: searching, creating, buying, sharing, commenting, or simply consuming contents (that is, reading, watching, or listening to them) takes up a big share of what we usually do with our smartphones and tablets (AOL-BBDO 2012). Furthermore, cultural contents play an increasingly relevant role in our communications. In interviews, users—especially those aged below forty-five years old—admitted their attitude and expectations with regard to mobile devices heavily depended on content availability, even when communicating to others. Content-related behavior thus becomes a valuable source of information not only about users and their world, but also, and precisely because of that, about user attitudes towards devices, content, services, and brands.

The personal and pervasive condition of mobile devices makes them highly suitable as information-gathering tools. According to

one of the interviewed experts, "mobile-based user profiles are much more relevant. It is not like the PC, which several people in your family or your workplace put their hands on. . . . What happens in your smartphone or your tablet is about you." Pervasiveness and ubiquity considerably broaden the range of contextual scenarios in which information is both used and gathered. They also make it possible to weave continuity and coherence into these different scenarios, thus bringing them together. The singular relation between mobile device and user, different from the one that is usually experienced with other digital devices, brings forth a specific horizon for both the operative and the economic value of personal information.

According to Acquisty (2010) and Feijóo and Gómez Barroso (2013), personal information involves data about users (user identification features such as name, address, economic data derived from purchasing or banking, health-related data, and so on) but also about what users do (behavioral information related to browsing, performing searches, using specific software and services, and so forth) and information about how and when they use services (frequency, persistence, etc.). Besides facilitating the building of more consistent user profiles, mobile devices provide additional relevant data concerning location and context-related information, therefore allowing companies to pinpoint the "how" and "when" in relation to behavioral and identity information.

Mobile platforms control software access to services, developers' innovation (via SDKs and OS specifications), content distribution channels (via content and application stores) and hardware specifications (including built-in sensors like GPS, accelerometers, gyroscopes and the like). As a consequence, mobile platforms get a privileged position to access and manage digital—not only mobile—personal information. As long as the barriers between conventional Internet and mobile Internet dissolve, mobile platforms get a significant advantage in a cross-device ubiquitous information environment (Feijóo and Gómez Barroso 2013). That concentration of the capacity to access and manage personal information in the hands of mobile-centered Internet players disrupts the way in which the value and the utility of personal information are distributed along the digital content value chain.

Vertical silo-model platforms, such as Apple, have a substantial advantage in that respect due to hardware/software integration. Semi-open platforms such as Google play the strategy of integrating an increasing variety of services and tools that become sources of personal information. In doing this, they actively involve third-party players (such as mobile application developers) in harvesting personal information. For example, Google's last API (Application Programming Interface) for Android allows developers to implement geofencing and activity recognition.[1] In the case of content producers, since their access to users is mediated by platform's distribution channels, they have a limited access to user-generated data. Content producers depend on platform owners or on third-party environments (such as browsers, search engines, social networks, ad networks, or content aggregators), which hinders their capacity to integrate user segmentation into mobile content business models (Aguado 2012).

The growing importance of personal information also raises concerns about privacy protection and transparency that, in the opinion of the experts we interviewed, will mark the digital policies agenda in the coming years (Luchetta 2013). On the supply side, there is a recent string of controversial events concerning secrecy and capriciousness in mobile data policies—from app installation effective permissions to hidden mobile tracking tools or changing privacy statements—that arouses users' distrust (Xu, Rossom, Gupta and Carroll, 2012). On the demand side, in our interviews with users we sensed a vague apprehension regarding the possibility of being unknowingly watched over—a kind of anxiety that, however, does not translate into them taking basic precautions or actively demanding information on how their activities and tastes are being tracked online; this confirms the so-called privacy paradox (Feijóo and Gómez Barroso 2013). How this may evolve as long as a personal data-based digital ecosystem consolidates and

1 Geofencing is about virtually delimitating an area by triangulation. Using geofencing as an app feature allows users to, among other things, associate mobile functions to the device being within (or outside) that defined area. Activity recognition involves determining the kind of user's movement patterns upon data provided by built-in sensors (walking, running, biking, driving a car…). See http://www.androidcentral.com/google-unveils-three-new-location-apis

new forms of mobile media (such as those provided by wearable devices) become popular constitutes a challenging field of study.

The specificity of mobile media—compared to other digital devices—comes from the fact that the most relevant source of information about users lies in their socially framed actions, where user identity plays an explicit role.

4. Changes in the Content Value Chain

From the perspective of traditional media industries, all the aforementioned developments involve a radical change in the value chain of cultural content. The legacy media's business model was characteristically content-centric and media-dependent. In short, content used to be the core and the end of the value creation process. Paraphrasing McLuhan (1964), in the old model the content was the medium. By controlling production and distribution, legacy media ensured the attention of wholesale audiences, which was in turn monetized in pay-per-access schemes or, more often, via advertising. The whole process ended up in content consumption: there was no value after content was read, watched, or listened to. In order to maximize control over production and distribution, the whole productive structure was designed according to media requirements (paper, radio, or screens), including expensive and complex distribution infrastructures. The confluence in the last decade of digital media explosion and financial crisis has thrown that model into serious trouble: the dramatic drop of advertising expenditure (Perry 2012), the rigidity of oversized media production structures (Westlund 2012) and the problems attached to licensing and intellectual property management (Punie et al. 2009) seriously challenge the viability of conventional media industries.

Legacy media thus face an urgent need to adapt to deep changes in production, distribution, and consumption. Old media business models show important dysfunctions in that adjustment: digital advertising is less effective as a revenue source than traditional advertising used to be, and pay-per-access formulas find it hard to work in a content-saturated environment with hundreds or thousands of free-access alternatives (Aguado 2013). Digital environments, in addition, feature two disruptive conditions that alter the structure of legacy media business: namely the de-

materialization of content and its integration into users' social dynamics.

In today's digital context, cultural content is becoming increasingly less constrained by the requirements of the medium and consequently more adaptable to a diversity of consumption scenarios. Dematerialized contents can be accessed through, and deployed in, different media (mobile devices, paper, big screens, etc.), whether in complementary or in alternative forms. New cross-media distribution models take advantage of this, and mobile platforms are becoming the basis for multidevice, malleable content circulation. Cross-media distribution fosters (and is equally favored by) cross-media consumption. The growing interest in transmedia storytelling (Scolari 2009) is connected with that transformation of content and its impact in distribution and consumption (Google and Ipsos 2012).

The second disruption factor linked to digital environment is socialization. Mobile technology stimulates an increased merging of media and communication that facilitates the integration of media into social dynamics. The social integration of media is not a new phenomenon, strictly speaking: virtually every theory on media effects deals, in one way or another, with how media activity enters everyday life. Furthermore, commenting on the latest news while having a coffee with one's workmates or recommending a movie to friends are natural ways in which media become part of our social interactions. The difference is that media-related social interactions are not just *about* media, but rather *within* media, and now take place in the same digital environment (and often in the same consumption scenario) in which content is accessed. From the perspective of media industries, this opens a whole new horizon of possibilities, as it expands the value chain of cultural content to include what comes after (or around) content consumption. In this sense, ubiquity, personalization, integration, and pervasiveness are key characteristics that ensure a natural merging of media and social situations (Feijóo et al. 2009).

Social networks (and especially mobile-based social networks) contribute to create new added value for media. The merging of media use and social networks contributes to establish user information processing as a relevant business model for digital media (Noguera et al. 2013). In this new model, emerging media

players try to provide the highest number and diversity of possible interactions so as to gather intensive data about user behavior, as this enhances the adaptation of services or advertising messages to users' profiles and contexts. As a developer we interviewed put it, "In the old [media] system, we paid for content with our attention. Now we pay for it with our data."

However, social networks do not only make for a new gold mine of personal information that enhances content as a source for user information, but they are also shifting the focus of media consumption from passive reception to media-related social interactions. This change in focus is not about media including (and benefitting from) social interactions; rather, it is the opposite—it is social interactions that include (and benefit from) the media. Interviews with users were conclusive on this point: it is the social relationship that constitutes a valuable object of consumption. Media become interesting to the extent that they contribute (as a language, as a topic, as an object of parody or emotional positioning, as a matter of re-creation and transformation) to the ritual of social interaction. Paraphrasing McLuhan again, the relationship is the medium.

5. Redefining Mobile Content and Consumption

Insofar as mobile devices enhance the merging of cultural content and social communications, users' attitudes and content consumption rituals have increasingly evolved towards an intervention paradigm. Broadly speaking, digital content is less attached to a contemplative, passive attitude, and resembles a matter to act upon (Scolari, Aguado and Feijóo 2012).

The consolidation of mobile applications as the prevailing interface for mobile media (Khalaf 2013) has contributed to the aforementioned change of paradigm. According to Scolari (2009), an interface is a meaning/action frame that presupposes a user (someone's intentions, attitudes, and competences) and an object (possible results) in a consistently connected way. In basic terms, an application is a piece of software—that is, a specific task-oriented tool. As such, an app is something that allows (and is meant for) users to *do* things. Since mobile content is increasingly accessed through native (platform-based) or web applications, the

specific connection between mobile content and user actions is especially emphasized in the mobile environment. Unlike media-oriented computer software, mobile applications bring forth a tight semantic link among object (content), user (presupposed intentions, attitudes, and competences) and specific tasks (Scolari, Aguado and Feijóo 2012). A user's relation to his or her apps is therefore much more identity-mediated than his/her relation to his/her desktop computer software used to be. Interviewed users aged under age forty-five, for instance, unanimously recognized that any stranger who accessed the list of apps installed in their smartphones would be able to get a very good idea of who they are and what they are like.

The evolution of mobile content apps over the last five years supports these assumptions. Drawing on a semiotic structural analysis of a sample of forty content-addressed mobile apps,[2] we developed a conceptual map defined by two axes (figure 2): media/tool orientation—from mere content display to high intervention capacity—and narrative/interaction involvement—from narrative-focused apps (in displaying or instrumental terms) to communication-focused apps.

2 The sample included content-addressed apps of the App Store and Google Play selected according to the following criteria: top free apps, top paid apps, top smartphone apps and top tablet apps. The results of that analysis are presented in part in Scolari, Aguado and Feijóo 2012, 2013.

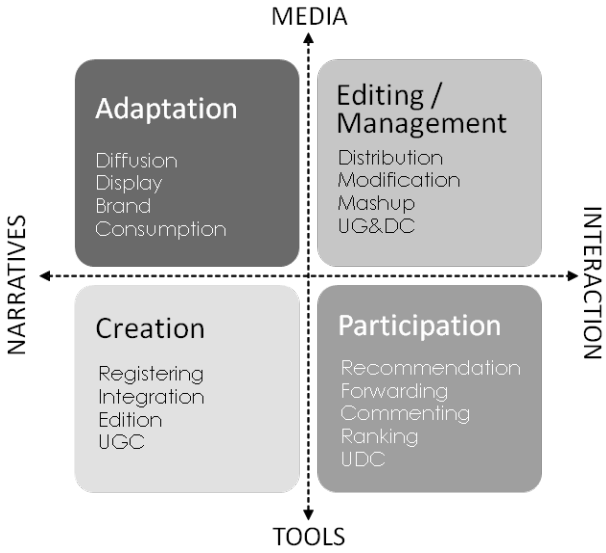

Figure 2: A conceptual frame for the classification of mobile content applications. Source: Scolari, Aguado and Feijóo (2013).

That scheme allowed us to differentiate four well-defined fields to develop a taxonomy of mobile content applications: ***Adapted or repurposed mobile content apps***, addressed to conventional media diffusion and consumption; ***creative mobile content apps***, addressed to facilitate registering, producing and editing user-generated contents (photos, videos, music, audio, etc.); ***content-management mobile applications***, focused on organizing and transforming conventional media content (libraries, playlist managers, etc.), and including some aspects of user-generated and distributed content; and ***participation mobile apps***, addressed to integrate mobile media and user-generated content into social conversations (including, from the perspective of media, the so-called user distributed content).

These fields are characterized by the prevalence of a given frame of presupposed actions and tasks: ***contemplation*** (which involves passive consumption of conventional content), ***intervention*** (which involves acting upon content to transform it), and

conversation (which involves using content as a source of meaning in social interactions). Figure 3 illustrates the structure of the prevailing actions that are characteristic of the different kinds of mobile content applications. The size of the circles in the graph represents relevance, while their position (inclusion/exclusion) represents subordination.

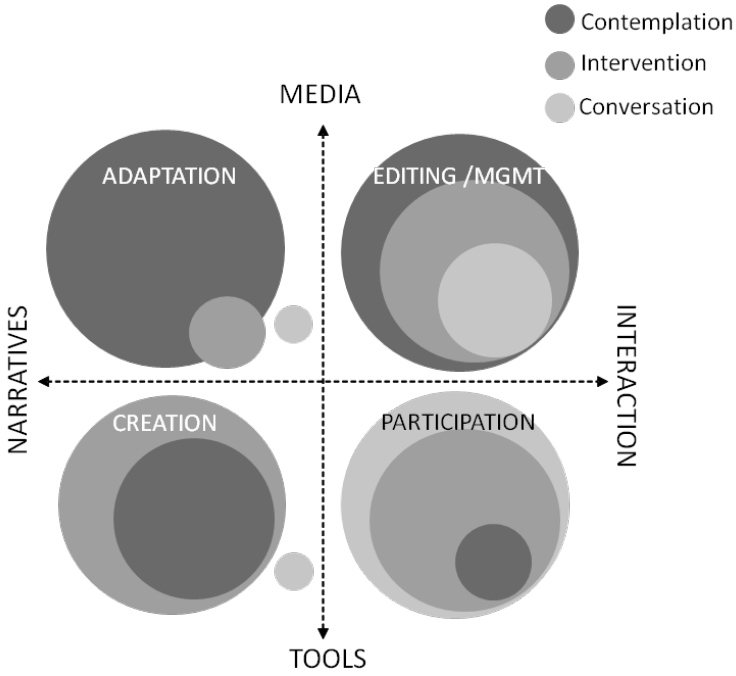

Figure 3: Structure of presupposed actions in mobile content applications. Source: Scolari, Aguado and Feijóo (2013).

Interestingly, this conceptual frame allowed us to assign a specific point in the positional map to any given app—according to the relevance of the app's features—and to observe how it evolved through the conceptual space insofar as its features changed in subsequent software upgrades. Since most of these upgrades involved new social network and editing features related to mobile content, the model makes it possible to see applications consistently shift from the upper left quadrant of the map (where narratives and passive attitude prevail) to the lower right one, where instrumental and interactional features become increasingly relevant.

There are other observable trends that support this argument. The growing importance of multiscreening (Google and Ipsos 2012) and its semantic translation into transmedia narratives seem to be directly related to users' activity with content. The so-called second-screen apps constitute a kind of software implementation of a consumption ritual that involves synchronizing different contents with social conversation-related activities. Users have incorporated conventional media consumption (like watching TV series, sports, or movies) in their mobile-mediated social conversations live, as it happens: for example, tweeting friends about an episode of one's favorite TV series in virtual copresent watching (Pew Research Center 2012). Content industries have turned their interest to mobile social networks and mobile applications as a new source for audience metrics (Aguado 2013) but also as a vehicle for promoting and expanding transmedia content (Scolari 2009). Second-screen apps contribute to systematize that integration between content and social interactions by linking social conversations to a given content (such as *The Walking Dead – Walkers' Kill Count*, a social network game-like application about guessing the number of kills in an episode of the popular TV series), by providing extra content and information (such as most of Disney's second-screen apps), by promoting content-related participation (as in apps complementing media coverage of the last Presidential election in the US) or by expanding contents in more participatory terms (as in the so-called Twittersodes that expand the story line of a TV series by way of adding characters' conversations).

Conventional and digital media pay increasing attention to what users do with content; media users increasingly conceive content as a part of their social interactions and consequently, as a matter to act upon, whether re-creating it (transforming mainstream media content into forms of parody, irony, protest, or support), co-creating it (merging it with user-generated content) or channeling it (recommending it, resending it, commenting on it, etc.). This process of transforming the way we conceive contents from a logic of *seeing* to a logic of *doing* favors a deeper connection between user identity and content consumption, which, in turn, reinforces the role of content as a source for personal information. Media expectations about digital (and mobile) user segmentation, and user expectations about spreadable, socially networked media, meet

in that very idea of merged content and tools that is embodied by mobile applications.

6. The Two Sides of "Me-spheres"

In previous research (Aguado and Martinez 2010; Aguado, Feijóo, and Martínez 2011) we have outlined the concept of "me-spheres" as a valuable term to delimit the play of social interactions within digital environments. Bearing in mind the complex ties linking online interactions to mobile-mediated social rituals in the physical world (see for example the Goffmanian approach by Ling, 2010), we do not intend to exhaustively depict here the full context of mobile-mediated social interactions, especially. Our approach will rather (and more modestly) focus on how mobile social interactions and mobile cultural content increasingly involve each other in terms of identity presentation and communicative exchange, but also as a part of some (relatively) new consumption dynamics. We would like to stress the role of the digital self and the incorporation of specific marks and rituals as an important part of mobile—and ultimately digital—consumption.

The argument behind this is twofold: on one side, digital and mobile-mediated social relationships have become a cultural product and a specific object of consumption (Noguera et al. 2013); on the other side, personal information (which constitutes a relevant outcome of such a kind of interactions) have become a core asset for digital and content industries influenced by the mobile ecosystem—as argued in previous sections.

The term "me-spheres" was coined with regard to the Web 2.0 as a way to designate the structure of digital identity (Aguado and Martínez 2010). It is important to note that this concept is not directly linked to social theories about the construction of the self, but rather to social (and, in this case, digital) practices about the presentation of the self. In a sense, thus, our interest here is to focus on the "construction of the (digital) presentation of the self" as an important part of socially framed (digital) rituals.

There is plenty of literature on the implications of digital interactions in the construction and representation of the self, together with a plethora of identity-related concepts, such as "virtual self" (Salimhan, Manago, and Greenfield 2010), "digital self" (Zhao

2005) or "digitized self" (Kupchik 2011)—leaving aside conceptual proposals on specific aspects of digitally mediated interactions, like Turkle's "tethered self" (2011) or Van Doorn's "networked identity" (2011). Most of them take into account contextual or intentional variables, like public/private, formal/informal, open/closed, and actual/ideal. The idea of "me-spheres" also connects with an incipient literature about digital personal information management, that frames the identity-related observables derived from digital activity with concepts such as "digital shadows" or "digital footprints" (Sarma and Girao 2009). The concept of "me-spheres" is located in the middle of the conceptual space between these two approaches: it is not meant to define the nature of digital identity, nor is it limited to the mere identity-related data resulting from digitally mediated interactions. Rather, it seeks to designate a structure of symbolic resources commonly used to present the self in relation to others in mobile-mediated social interaction rituals. Inasmuch as these rituals involve an enjoyment-related attitude, they can be operative in terms of consumption; they can also be understood as a sort of "identity games."

The term underlines the idea that the digital presentation of the self plays a central role in social media performances and that any digital activity is referred to it—and, hence, social. Me-spheres thus define the ground of digital social interactions, but at the same time they are constituted through that kind of social relations. To some extent, the idea of me-spheres reproduces Goffman's interactional strategic conception of the self. In his terms, me-spheres constitute the repository on which users draw to perform their own digital façades or fronts as "that part of the individual's performance which regularly functions in a general and fixed fashion to define the situation for those who observe the performance" (Goffman 1956, 14).

In this respect, users we interviewed agreed on the strategic nature of digital façades: they are explicitly aware of the fact that enacting a given symbolic resource about the self in a digital interaction determines the nature of that encounter. Some users have, for instance, different avatars, profile pictures, or even usernames tailored according to the nature of digital interactions they are involved in. Furthermore, that strategic nature is emphasized as social network interactions are usually lived as "suspended"

encounters ("When you post something on somebody's (Facebook) wall or when you tweet, you never know when they are going to read it or if they will respond. It's just there." Woman, 24). That deferred nature gives socially networked interaction a deeper strategic sense and prefigures it as a game of impression management (Goffman 1956).

The fact that social network interactions are increasingly mobile—as a result of the preponderance of mobile-first social networks, like Twitter, or the "mobilization" of desktop-native social networks, such as Facebook—expands the strategic condition of digital interactions and makes the building of the digital self a pervasive, ubiquitous concern.

The intrinsic fragmentation of the digital self is also related to that strategic nature: users decide on the role and the aspects of the self they perform, and these decisions are made according to the environment in which the suspended encounter may take place rather that according to the encounter itself. In other words, users tend to enact different aspects of the self with regard to the social network they are using (professional or interest-related fronts in LinkedIn, affective fronts in Facebook, informal fronts in Twitter, etc.), but sometimes they decide to modulate façades regardless of the characterization of the social network. For example, some adult users prefer to use Facebook for professional concerns and upload photos about their careers or post content about their professional interests. Younger users, in turn, are more prone to display hybrid fronts and the aspects they usually merge are affective, interest-related (like music or technology), political, and entertainment-related (like gaming achievements or jokes). Google Plus Circles, for instance, can be understood as an attempt to put that kind of façade management into effect.

However, many mobile services and contents involve social network integration as a part of promotion strategies. They also implement multisocial, media-channeling tools which, among other things, make it easier for users to forward content or comments simultaneously to Facebook, Twitter, Linkedin, Tumblr, or Google Plus. Social media, in addition, offer users a chance to integrate the flow of content and activities coming from other social networks—for instance, by inserting Twitter's flows into a Facebook Wall. As a result, users become increasingly aware of the

fact that intercommunication among different social media means also intercommunicating digital façades and having different interlocutors get potential access to unintended aspects of a user's identity. In addition, social media are deploying a variety of tools that allow users to track or measure social activity (timelines, statistics, activity maps, etc.), thus magnifying the social visibility of identity-centered social interactions. All these aspects reinforce the need for coherence in constructing digital identity, turning the care for me-spheres into a relevant concern. That is why some of the interviewed experts refer to that process as "digital brand" construction.

We should bear in mind that social media are not solely a social interaction environment; they are also a consumption environment where presenting oneself and relating to others becomes part of an impression-management game. In that context, following Arnould and Price (2000), we understand that the expression of identity is carried out co-ordinately in a self-centered way (explicitly showing or uttering aspects of the self) and in an affiliative way. "Affiliative identity is important for situating the self within the social world and for communicating identity to the intended audience (peer group, government, descendants, etc.). Where individual identity may be said to demonstrate 'me,' affiliative identity establishes 'we'" (Schau and Gilly 2003, 387).

Accordingly, the structure of mobile me-spheres adopts the shape of a concentric overlapping of actions and expressions, complementarily focused on the self and the others, with media content as a mediating layer between them (figure 4).

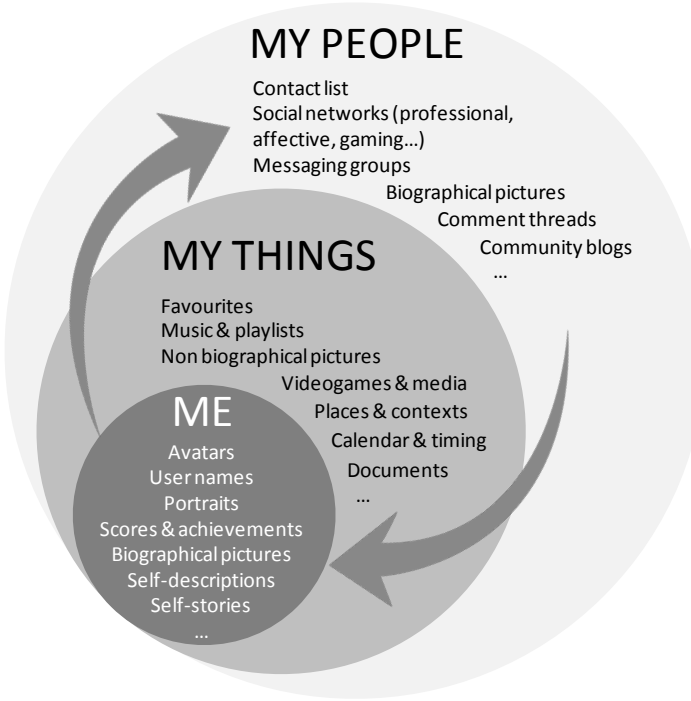

Figure 4: Structure of me-spheres. Source: Elaborated by the authors.

The self-centered nature of me-spheres entails more or less standard ways to depict one's self, such as avatars (formal or informal), user names, portraits, biographical pictures, gaming scores and achievements, short self-descriptions (like the ones published in Twitter or Facebook profiles) and longer self-stories (like posts in personal blogs). On the other hand, the affiliative side of me-spheres includes group and community profiling devices, such as contact books, other users' portraits and biographical pictures (involving, for example tagging other people's presence), social network circles, signed comment threads in blogs or other socially addressed media, and participation in community blogs.

Digital content is used in performing both self-centered and affiliative aspects of one's identity as a symbolic mediator. Semiotics and consumer behavior studies emphasize the expressing role of objects (that is to say, the communicative nature of consumption):

"One of the most important ways in which people relate to each other socially is through the mediation of things" (Lury 1996, 1). In fact, relationships with objects are claimed to be "never a two-way (person-thing), but always three-way (person-thing-person)" relationship (Belk 1988, 147). Digital content is simultaneously an object of possession and a symbolic construction addressed to expressing meanings. In a sense, while the consumption of objects consists of appropriating things as meanings, the consumption of content involves appropriating meaning as a thing. Due to its user-attached and context-related condition, mobile content proves to be especially powerful in that respect: mobile music, videogames, videos, or favorite apps become the objects of symbolic appropriation in performing self-centered or affiliative identities.

The kind of actions that allow users to construct me-spheres and to perform digital presentations of the self is the kind of actions that allow them to appropriate digital (and especially mobile) contents. Furthermore, the structure of actions involved in the cultivation of me-spheres matches the structure of personal information flows discussed elsewhere in this paper. The mobile-mediated social performance of identity, thus, seems to be played in two complementary ways: as a social game and as a business model at the same time.

7. Conclusions: The Two Meanings of Understanding Relationships as a Medium

Within the new mobile ecosystem and its expansion to cross-media environment by means of digital platforms, media content acquires new dimensions. Even as it is still a specific object of consumption—to be watched, read, or listened to—mobile content increasingly becomes a functional asset in integrating social interactions into consumption dynamics (Noguera et al. 2013).

By controlling access to content and services via dominant distribution channels (such as app stores), mobile ecosystem players have a privileged access to users' behavioral, contextual and profiling data. Exhaustive personal information channeled through a complex network of content and services means important advantages in forecasting user preferences and in adapting advertising as well as product and service supply. Digital platforms

thus expand the traditional media's content value chain, while they create new value sources beyond content consumption and incorporate whatever users do with content (sharing, commenting, forwarding, transforming, editing, etc.). While in the old media system a user's interest used to be monetized through advertising, in the emerging and increasingly cross-device media environment it is monetized via personal information (Aguado 2013).

Users' capacity to act upon content—especially in the mobile context, where a close link between device, user identity, and everyday routines exists—becomes then much more than a bonus feature: the capacity to tinker with contents and to naturally insert them into the daily flow of mobile-mediated social interactions is a necessary condition for the implementation of business models based on the handling and exploitation of personal information (Scolari, Aguado and Feijóo 2012). Here, mobile (and digital) content gets a secondary but nevertheless relevant role. The evolution of mobile content applications and related services towards an intervention paradigm, which fuses together tools, contents, and interaction, has undoubtedly favored that trend.

Mobile communication technology does not play a trivial role in that process. Not only is it the foundation on which cross-media, personal-information-based platforms are erected, but the intrinsically relational nature of mobile devices helps to turn the act of communicating with others into a consumption practice, and to transform everything within communication—including content creation, access and consumption—into a matter of social relationships.

From a user's perspective this process looks rather like the opening of a vast horizon for developing social ties, as it involves a wide variety of scenarios, tools, and shapes, as well as an increasing adaptation of products, services, and everyday life situations to user profiles and user needs. No wonder digital identity management becomes a relevant concern: interacting with others means performing self-centered and affiliative identity aspects in an impression management game. Digital (mobile) content plays a decisive mediating role in it, allowing users to appropriate and create meanings. That self-presenting and community-building game is performed on the basis of a sense-making effort, the result of which is understandable in terms of me-spheres. These represent

the repository of marks, symbols and actions engaged in delimiting strategic aspects of the self both in demonstrative and affiliative terms. The structure of objects and actions encompassed by digital me-spheres broadly matches the structure of personal information flows that allow digital industries to adapt services to user profiles and monetizing users' behavior data.

The relationship becomes, then, the *medium* in a double sense: first, by progressively taking the place of content as the core value in cultural consumption dynamics (Aguado 2012; Noguera et al. 2013). Legacy media and content industries need to adapt to that circumstance, since their management structures and traditional business models are tailored to a content-centric, media-dependent conception of cultural consumption. Secondly, by becoming a mediating factor between the users' digital identity game—based on the *access* to personal information—and the industries' monetizing strategies—based on the *processing* of personal information (Feijóo et al. 2009).

Figure 5 summarizes the convergence among the three processes considered in this paper (the relevance of personal information as an economic asset in the digital environment, the expansion of the content value chain by means of integrating users' social activity into value creation, and the consolidation of new identity and social interaction-oriented content consumption). It also illustrates the central role mobile media play in this convergence process by enacting a two-side conception of mobile social interactions, that is both as objects of cultural consumption and as sources of economic value.

Most of the available research on the issues discussed in this paper has been developed separately: studies on the technical, economic, legal and social aspects of personal information economy, inquiries about the transformations of content industries and the adaptation strategies of the legacy media ecosystem to the new digital environment, and research on the changes taking place in digital social interactions and digital performances of the self. Nevertheless, interplay among these aspects seems to be a relevant factor shaping both economic and social phenomena, and it is centered around mobile communications. The arguments in favor of a coordinated approach to these three aspects deserve further consideration and an interdisciplinary study of ubiquitous social

information environments may constitute a valuable meeting point to that end.

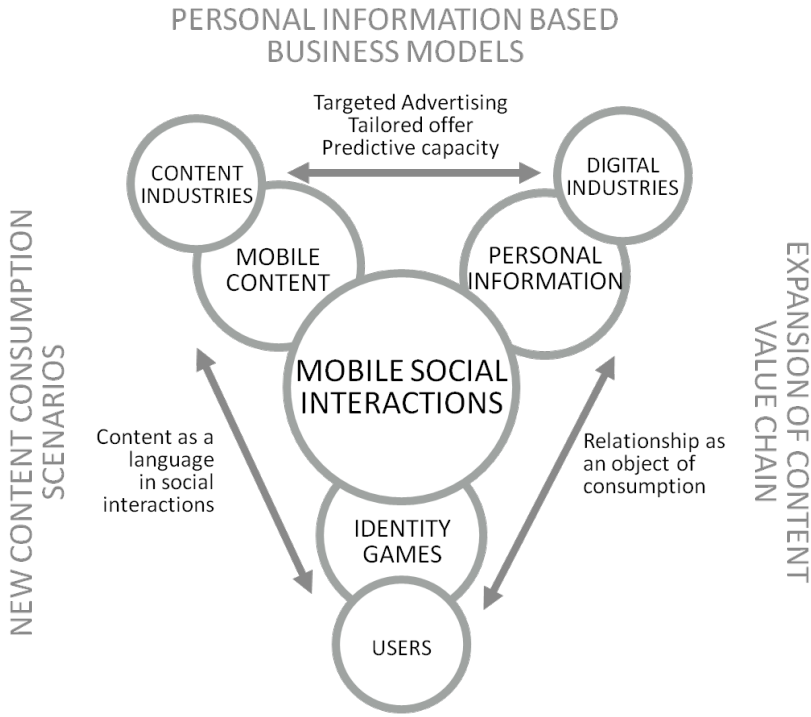

Figure 5: Vectors of content-related transformation in the mobile ecosystem. Source: Elaborated by the authors.

References

Aguado, Juan Miguel, and Inmaculada J. Martínez. "Liquid Digital Selves: Mobile Media Implicit Cultures, Social Relations and Identity Management." *Encyclopaideia: Journal of Phenomenology and Education* 15, no. 1 (December 2010): 63–88.

———, Claudio Feijóo, and Inmaculada J. Martínez. "Contenidos digitales y comunicación móvil: hacia la transformación de Internet." *Derecho a Comunicar* 2, no. 3 (2011): 1–15.

———. "Los gigantes, los ratones y el pastel: Las industrias culturales y el entorno de la movilidad." In *Mobile Communication 2012. Experiences y Reçerques sobre Comunicació Mòbil,* edited by Hector Navarro, 7–21. Vic, Barcelona: GRIID Publicacions, 2012.

———. "La industria de contenido en la era post-PC: Horizontes, amenazas y oportunidades." in *Notícias e Mobilidade: Jornalismo e Dispositivos Móveis*, edited by Suzana Barbosa and Lucia Mielniczuk, 5–28. Covilha, Portugal: Livros Labcom, 2013.

AOL-BBDO. "Seven Shades of Mobile. The Hidden Motivations of Smartphone Users." Research Report. October, 2012. http://advertising.aol.com/sites/default /files/ content/download/attachment/research/aol-bbdo-7-shades-mobile-abstract-final.pdf

Acquisti, Alessandro. "The Economics of Personal Data and the Economics of Privacy. 30 Years after the OECD Privacy Guidelines". OECD, 2010.

Arnould, Eric J., and Linda L. Price. "Authenticating Acts and Authoritative Performances: Questing for Self and Community." In *The Why of Consumption: Contemporary Perspectives on Consumer Motives, Goals, and Desires,* edited by Srinivasan Ratneshwar, David Glen Mick, and Cynthia Huffman, 140–63. New York: Routledge, 2000.

Ballon, Pieter. "The Platformisation of the European Mobile Industry." *Communication & Strategies* 75, 3rd Quarter (2009): 15–34.

Belk, Russell. "Possessions and the Extended Self." *Journal of Consumer Research* 15 (September 1988): 139–68.

Feijóo, Claudio, Corina Pascu, Gian Paolo Misuraca, and Wainer Lusoli. "The Next Paradigm Shift in the Mobile Ecosystem: Mobile Social Computing and the Increasing Relevance of Users." *Communications & Strategies* 75, 3rd Quarter (2009): 57–77.

———, José Luis Gómez Barroso, Juan Miguel Aguado, and Sergio Barrero. "Mobile Gaming: Industry Challenges and Policy Implications." *Telecommunications Policy* 36, no. 3 (2012): 212–21.

———, and José Luis Gómez Barroso. "Hacia una economía de la información personal." In *La comunicación móvil: Hacia un nuevo ecosistema digital*, edited by Juan Miguel Aguado, Claudio Feijóo and Inmaculada J. Martínez, 305–322. Barcelona: Gedisa, 2013.

Goffman, Erving. *The Presentation of the Self in Everyday Life*. Edinburg: University of Edinburg Press, 1956.

Google and Ipsos. "The New Multi-Screen World." Research study. August 2012. http://www.thinkwithgoogle.com/research-studies/the-new-multi-screen-world-study.html

Khalaf, Simon. "Flurry Five-Year Report: It's an App World. The Web Just Lives in It." *Flurry Blog*. http://blog.flurry.com/bid/95723/Flurry-Five-Year-Report-It-s-an-App-World-The-Just-Web-Lives-in-It.

Kupchik, Gerald C. "The Digitized Self in the Internet Era." *Psychology of Aesthetics, Creativity, and the Arts* 5, no. 4 (November 2011): 318–28.

Lee, Edmund. "Apple's ITunes Would Be One of World's Biggest Media Companies." *Bloomberg Tech Blog*. http://go.bloomberg.com/tech-blog/2012-12-03-apple%E2%80%99s-itunes-would-be-one-of-world%E2%80%99s-biggest-media-companies/.

Ling, Rich. *New Tech, New Ties: How Mobile Communication is Reshaping Social Cohesion*. Massachusetts: MIT Press, 2010.

Luchetta, Giacomo. "The Law and Economics of Intermediaries of Personal Information." Paper presented at the 24th European Regional Conference of the International Telecommunication Society, Florence, Italy, October 2013.

Lury, Celia. *Consumer Culture*. New Brunswick, NJ: Rutgers University Press, 1996.

Manjoo, Farhaad. "The Great Tech War of 2012." *Fast Company*, January 12, 2012, http://www.fastcompany.com/magazine/160/tech-wars-2012-amazon-apple-google-facebook.

McLuhan, Marshall. *Understanding Media: The Extensions of Man*. New York: New American Library, 1964.

Noguera, José Manuel, Miko Villi, Melanie Bourdaa, Nora Nyiro, and Emiliana de Blasio. "The Role of the Media Industry

when Participation is a Product." In *Audience Transformations: Shifting Audience Positions in Late Modernity*, edited by Nico Carpentier, Kin Schroder, and Lawrie Hallet, 172–190. New York: Routledge, 2013.

Perry, Mark J. "Newspaper Ad Revenues Fall to 60-Yr. Low in 2011." *Seeking Alpha* (blog). http://mjperry.blogspot.com/2012/02/newspaper-ad-revenues-fall-to-50-year.html

Pew Research Centre for the People & the Press. "One in Ten 'Dual-Screened' the Presidetial Debate." Research report. October 11, 2011. http://www.people-press.org/2012/10/11/one-in-ten-dual-screened-the-presidential-debate/.

Punie, Yves, Wainer Lusoli, Clara Centeno, Gianluca Misuraca, and David Broster, eds. *The Impact of Social Computing in the EU Information Society and Economy*. Report. Institue for Prospective and Technological Studies and JRC Scientifical and Technical Reports European Commission. November 2009. http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=2819

Salimhan, Goldie, Adriana Manago, and Patricia Greenfield. "The Construction of the Virtual Self in MySpace." *CyberPsychology: Journal of Psychosocial Research on Cyberspace* 4, no. 1 (2010). http://cyberpsychology.eu/view.php?cisloclanku=2010050203&article=1.

Sarma, Amardeo C., and Joao Girao. "Identities in the Future Internet of Things." *Wireless Personal Communications* 49, no. 3 (2009): 353–363.

Scolari, Carlos A. "Transmedia Storytelling, Narrative Worlds, and Branding in Contemporary Media Production." *International Journal of Communication* 3 (2009): 586–606.

———, Juan Miguel Aguado, and Claudio Feijóo. "Mobile Media: Towards a Definition and Taxonomy of Contents and Applications." *International Journal of Interactive Mobile Technologies,* 6, no. 2 (2012). http://online-journals.org/i-jim/article/view/1880.

———, Juan Miguel Aguado, and Claudio Feijóo. "Una ecología del medio móvil: contenidos y aplicaciones." In *La comunicación móvil: Hacia un nuevo ecosistema digital*, edited by Juan Miguel Aguado, Claudio Feijóo, and Inmaculada J. Martínez, 79—106. Barcelona: Gedisa, 2013.

Schau, Hope J., and Mary C. Gilly. "We Are What We Post? Self-Presentation in Personal Web Space." Journal of Consumer Research 30, no. 3 (2003): 385–404.

Turkle, Sherry. *Alone Together: Why We Expect More from Technology and Less from the Others*. New York: Basic Books, 2011.

Van Doorn, Niels. "Digital Spaces, Material Traces: How Matter Comes to Matter in Online Performances of Gender, Sexuality and Embodiment." *Media, Culture & Society* 33, no. 4 (May 2011): 531–547.

Westlund, Oscar. "Producer-Centric vs. Participation-Centric: On the Shaping of Mobile Media." *Northern Lights: Film & Media Studies Yearbook* 10, no. 1 (May 2012): 107–121.

Xu, Heng, Mary B. Rossom, Sumeet Gupta, and John M. Carroll. 2012. "Measuring Mobile User's Concern for Information Privacy." Paper presented at the 33rd International Conference on Information Systems, Orlando, FL, December 2012.

Zhao, Shanyang. "The Digital Self: Through the Looking Glass of Telecopresent Others." *Symbolic Interaction* 28, no. 3 (2005): 387–405.

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Part 2

In the Field

6

Living Inside Location-Aware Mobile Social Information
The Pragmatics of Foursquare Notifications

by

Christian Licoppe

Abstract

This chapter reports on a case study of the uses of Foursquare in Paris. It focuses on the pragmatics of location awareness and, more specifically, on how Foursquare users describe location checks as a kind of "invitation." Though not lexico-grammatically designed as invitations, they may be viewed as such retrospectively, on the basis of responses displaying an understanding that they make relevant a possible encounter. However, users recognize them only as a very particular type of "invitation," enacting weak obligations between coparticipants and partly unspecified addresses. Building on that, this paper discusses (a) how the "competent" management of location checks performs an opportunistic rather than a strategic subject, oriented towards emergence and serendipity, and (b) how it also highlights the enactment and support of feeble bonds, mostly because the weak mutual obligations that the production and management of location checks entail resonate with the weakness of the mutual expectations that characterize those bonds. This analysis unveils some of the deeper connections that may exist between phenomena that are often discussed separately—

such as the orientation towards emergence and serendipity, which characterize mobile social media in general—and the reinforcement of a weak bond-based sociability, which seems to be an important feature of the use of social network applications.

Introduction

This chapter addresses the question of "living inside mobile information" from the perspective of location-sharing social networking applications, or LSSNs (De Souza e Silva and Frith 2010), usually available through computers, tablets, and smartphones. With these mobile applications, users are made aware of the location of others through notifications and can volunteer such information in the same way themselves. Part of their experience of "living inside mobile information," therefore, consists of dealing with the social implications of location awareness. As early empirical studies of such types of applications have shown, these implications have a lot to do with the ways in which such location information is noticed, acknowledged, and may be taken as warranting future encounters, as in the case of Dodgeball (Humphreys 2007). The same issues also arose in location-aware games, though in this latter case social networking and locational, knowledge-mediated encounters seemed to develop as a collateral consequence of location awareness, within or in addition to the more focused orientation of designers and users towards the game itself (Licoppe and Guillot 2005; Licoppe and Inada 2010). Though they are not yet a commercial success and concern mostly lead users, current LSSN applications and platforms offer an interesting basis for gaining new insights on what the experience of living inside mobile location information might, more generally, be about, and I report here on an empirical study of the uses of Foursquare in Paris carried out to that end.

Previous studies of Foursquare have typified different motivations for checking in and different ways of using the game, such as *purpose-driven* and *socially driven* uses (Tang et al. 2010; Lindqvist et al. 2011), and have extensively discussed privacy issues (Iachello et al. 2005). The uses of Foursquare have been mostly analyzed from a perspective which can be described as informational, cognitive, and psychological: location checks are understood

as actions making available an information, with the meanings and motives of an individual actor—the location checker—as the main focus of such research. In line with that cognitive and psychological orientation, a recent study proposed to contrast two different communicational styles: a "for your information" (or FYI) style, in which "FYI communicators preferred to learn others' whereabouts, availability, or recent activity by reading updates on social media; they avoided phone calls and direct interaction with the other person," and could be regarded as "more actively engaged and more comfortable sharing on various social media." On the other hand, there is the "active communion style," where people eschew location sharing and the use of LSSN, and prefer learning others' whereabouts through more direct conversations (Page et al. 2013). Here, again, the focus is on location as information and knowledge, and the individual agents' ways of learning about it. Rarer are the studies that operate outside the cognitive psychology box, to argue that "sharing one's location is a social negotiation with whom you are sharing with" (Brown et al. 2007), and to argue on that basis that in the case of Foursquare, the analysis should look upon location checks as performative events and focus on the ways audiences interpret and manage their implications (Cramer et al. 2011). I would like to build on that kind of insight and will thus focus here on the pragmatics of location checks.

Location checks are a type of written event, akin to a speech act (and we will see that this is also the way users perceive them), which involves the "sudden" materialization on someone's screen of another person's discursive claim about their location. Thus, location checks will be regarded here as a kind of social action to be (possibly) responded to and not just as a factual claim about one's location. In line with pragmatic philosophy, we will not attempt to ascribe a meaning to such an action. Instead, we will try to look at how it is given a meaning in the concrete practices through which it may possibly be noticed, attended to, acknowledged, and acted upon (Dewey 1958, 178–9). It is therefore in the actual responses of potential recipients the kind of social action that a relevant and accountable understanding of what a location check might do is accomplished, the propriety of which becomes available for ratification or repair. What a location check does is a joint accomplishment, produced by the participants and displayed

and made available to the participants and analysts alike through the actions that are created in response to it. By focusing on the micro-organization of the interactions that develop around the production of location checks, this approach provides some access to what it means to be a member of the Foursquare community and what the subjective experience of living inside location-aware mobile information might consist of. Being part of the Foursquare "form-of-life" involves competently playing the location check "language game" (i.e., managing the pragmatic implications of actual location checks *qua* social actions in an accountable way).

This study will demonstrate that, although not lexico-grammatically designed as invitations, location checks may be heard as such retrospectively, on the basis of responses displaying an understanding that they make relevant a possible encounter. However, users recognize them only as a very particular type of invitation, enacting weak obligations between coparticipants and partly unspecified addresses. Building on that, the paper will discuss how the "competent" management of location checks (a) performs an opportunistic rather than a strategic subject, oriented towards emergence and serendipity, and (b) highlights the enactment and support of feeble bonds, mostly because the weak mutual obligations that the production and management of location checks entail resonate with the weakness of the mutual expectations that characterize these bonds. This analysis unveils some of the deeper connections that may exist between phenomena that are often discussed separately—such as the orientation towards emergence and serendipity, which characterizes mobile social media in general—and the reinforcement of a weak bond-based sociability, which seems to be an important feature of the use of social network applications.

Foursquare as a Location-Sharing Application

Location-based mobile social networks, or LMSN (De Souza e Silva and Frith 2010), either make locations visible through geolocation technologies (as in Facebook Place or Google Latitude) or through the postings of users who "check in" to their locations, and therefore make it visible to others. According to users' privacy settings, these "others" may be the whole set of users ("all"), a

chosen list of friends, or no one at all. Foursquare is a mobile social networking application of the second kind (i.e., a "location-sharing social network" or LSSN), as was Dodgeball or Gowalla. One particularity of Foursquare is that users may check in at particular venues or "places," some of which are provided by the service along with many others that are invented and created by the users themselves. These "places" can be of two sorts: "geographical" ones (which make sense to a generic urban dweller), and "relational" ones (which are meaningful only to a set of users sharing some acquaintances and common ground, such as "happy house"). The socially-driven creation of relational place names seems to dominate and to be a constitutive feature of the Foursquare experience (Tang et al. 2010). Another particularity of Foursquare, which we will not discuss here and which has to do with the "gamification" of such mobile social networking applications, is that users may compete for specific titles tied to these created places, such as "mayorships" and badges. This creates a playful and competitive environment for often checking into one's location; it is on the basis of the number of location checks in a given place that one may become the "mayor" of a particular place or lose the title (Lindqvist et al. 2011). Location checks are not necessarily tied to Foursquare only, for they may be made visible on other social networking platforms such as Facebook or Twitter. Users who check into a venue see other users who have also checked into the location in the last three hours and may exchange messages with them.

Fieldwork

We led an interview- and observation-based study of thirty Foursquare users in Paris between 2011 and 2012. The sample included nine men and twenty-one women. Ages in the sample varied between nineteen and fifty-five, with the bulk of the sample (75%) falling between twenty-five and thirty-five. Seven of the interviewees were students and the rest were entrepreneurs or occupied white collar positions in firms within the fields of communication, management, advertising, or information technologies; nearly all had university-level diplomas. Available (but uncertified) figures on the Internet at the time credited Foursquare with about 15,000 active users in the Paris area, most

of them being lead users (particularly young professionals with an interest in technology).

The interviews were carried out in two parts. First, we tried to investigate the users' motives and the concrete circumstances in which they were led to employ, and actually employed, this kind of mobile location-sharing application. Then we asked them to launch and navigate the application while we took pictures of them, explaining to us as they did what they were actually doing and what they were used to doing. We thus tried to get them to elaborate on (a) more concrete examples of the kinds of uses which were common and significant to them, and (b) the particulars of their social networks, the mobile contents that their Foursquare interfaces made visible, and their understanding of interface functionality and interface-mediated notification events. The interviews, including the handling of the application, were video-recorded by us.

Location-Sharing as a Kind of "Loose" and "Global" Invitation

When users check into Foursquare and make their location potentially visible to others, the meaning of such an action may vary considerably according to the kind of place they check into. For instance, checking into one's home, office, or vacation place may be interpreted as a sign of unavailability, though this may also depend on the proximity of potential recipients, as we will discuss in more detail below. (For instance, "discovering" through Foursquare that one is also vacationing very close by might be taken as an opportunity for contact.) On the other hand, checking into public places is usually read as a sign of availability, and even more: *"One communicates on the fact that one is there without requiring that others do the same, and it creates a form of* ***global invitation****, which is rather cool in the idea of getting closer to one's friends"* (Yacine, 19 y.o.). This quote exemplifies how providing one's location needs to be understood as more than just the provision of information and a contribution to individual users' locational knowledge, as computer science and psychology would too often have it. The important issue is how it is noticed, recognized, and acted upon (Brown, et al. 2007), and more specifically in the pragmatic view I develop here,

what kind of social action may be taken to accomplish it. The quote above is quite explicit in that respect: a location check is regarded as a kind of "global invitation." Describing check-ins as invitations was very common in our sample, and it is worth reflecting a little on such a categorization. Invitations are a particular type of speech act (Austin 1975) from the class of directives (Searle 1975). However, there is nothing in the lexico-grammatical design of most Foursquare location notifications that makes them recognizable as invitations. This appears plainly if we compare "Chloe is at the Grizzly Café" appearing on one's smartphone (a typical location notification) with "I am at the Grizzly Café. Do you want to come and have a drink with me?"—a typical invitation or offer (designed as such) which could be uttered during a phone call or sent through a text message. However, although location notifications such as "Chloe is at the Grizzly Café" may look like simple, factual claims, as in the quote above, they will be recognized and interpreted by most potential recipients as global invitations.

The categorization and description of location notifications as invitations has to be understood as operating backward from the response it elicits. It is because active users have regularly treated them as making relevant a possible meeting, and because an "ordinary" invitation *qua* speech act projects a meeting, that location sharing may be categorized as an invitation. Check-ins—at least some of them—have a family resemblance (in Wittgenstein's sense) with invitations (in the Austin-Searle sense), because they are read by some potential recipients as making relevant a potential encounter, providing grounds for some subsequent courses of action (such as telling Chloe they will join her at the Grizzly Café in the above example). On the other hand, interpreting them properly as invitations and competently "reading" the potential invitation behind the factual appearance of the notification indexes a community of users that is well socialized in the use of Foursquare. The competent production and treatment of check-ins as notifications enacts a "form-of-life" which involves both an interpretive community and a way for its members to live inside (location-based) mobile social information.

Let us explore further the sense in which checking in only has a "family resemblance" with more traditional forms of invitations, as would be produced, for instance, in face-to-face encounters, phone

calls, or letters. A check-in may be considered as an invitation, but it is a "global" one that comes with an open list of potential recipients. Unlike an invitation uttered in a conversation, it does not select a recipient. It is less *addressed* than *made available to* whoever may potentially see it (which will vary according to privacy settings) and among these, who may or may not self-select as a recipient and perform themselves in that position through their actions. The formulation of the place in which one checks in may restrict recipiency even more. For instance, if one checks into a place that is relationally formulated, the place will be intelligible only to the interpretive community for whom such a formulation makes sense. However, it will still be an "open" invitation in the sense that it will be available to more than one addressed person and may be actively recognized and picked up by potential recipients.

A location check is also a weaker, or looser, form of invitation than more traditional ones, for it entails fewer obligations on the part of the recipient. If one invites a friend to come and have a drink over the phone, the very uttering of the invitation constitutes the recipient as an invited party, with special rights and obligations. For instance, such an invitation produced during an interpersonal encounter is expected to be acknowledged and strongly projects acceptance. There is a preference for acceptance for which conversation analysis has produced strong empirical evidence (Levinson 1983; Pomerantz 1984): while acceptances are short and to the point, refusals are marked utterances, usually produced with pauses, delays, self-repairs, and/or various accounts. On the other hand, a check-in seems to entail nothing of the sort: *"I say I'm there, they come or they don't come"* (Yacine, 19 y.o.). Such a quote suggests it is left to the potential recipients' discretion to determine how to deal with it. It may be perfectly ignored; it is neither expected that it should be acknowledged nor that it should be refused, and there does not seem to be a preference system operating with such a social action which would strongly project acceptance.

In a similar vein, a potential recipient may "read" a location check-in as a potential invitation. It may even be seized upon as an opportunity for making an encounter relevant without, however, the check-in being considered to be initially produced or consciously meant as an invitation, nor as an invitation to any particular recipient: *"As we are used to be invited through Facebook*

events, one tends to link the fact of being somewhere and telling about it to some form of invitation, even though we are not meant to be invited" (Cyrille, 24 y.o.). Doubting the intentions of the location checker is not necessarily a reason for not considering an encounter relevant. The same user quoted above indicated for instance that, though he was unsure of the initial intention behind the original check-in, if he saw that many of his friends were joining at the same location, he might feel like going there, too.

That there is an orientation towards considering location check-ins as mere loose invitations is made obvious by the fact that treating check-ins too systematically as an invitation is regarded as a kind of "faux pas." This can even become a topic for gossip and in-group play, in which the person who always arrives on the scene after someone has checked in (which amounts to always treating check-ins from friends as invitations) becomes the butt of a standing joke: *"One of our friends is called Martin PetitJean and he follows it a lot on Facebook. Even though he is not meant to be invited, he tends to come. So we get to be two or three together in the Champ de Mars or the Café des Officiers nearby, we check in, and we bet on the time it will take for him to get there though nobody invited him."* (Cyrille, 24 y.o.). This kind of ironical joke shows that the looseness in the way check-ins may be treated as invitations is a constitutive feature of the kind of social action they are taken to be. They are not to be taken too lightly, as just the provision of information, nor are they to be treated too seriously and systematically as a "full" invitation with all the rights and obligations a proper one would entail.

This looseness is taken to contrast with a strong model of the invitation, in which it is meant and designed as such, for a selected recipient who is obliged by it. A proper invitation projects normative expectations regarding an answer (and therefore normative expectations regarding the fact that the recipient will responsively act upon it), and enacts preferences regarding the type of response that might be produced. The tighter these normative expectations, the more the relationship of an invitation to its response may appear as taken for granted. And a Foursquare check-in is definitely not like that: *"Many things may occur upon that information and one does not know in advance…when one checks, when one sends that information, with social networks…there are less these expectations with respect to 'I do that'…from cause to*

effect, the relationship is not immediate" (Damien, 30 y.o.). Location check-ins are generally oriented to as events occurring randomly and materializing in one's environment to be noticed, recognized, picked up, and perhaps responded to almost at will: *"That is, one is much more in the discovery, in the opportunity. Will things happen? Will things not happen?...One is more passive with respect to that, but one provides information that allows things to…"* (Damien, 30 y.o.). So a response which will retrospectively display the understanding of the check-in as an invitation will also display the alignment of the potential recipient's interests with such a reading as a chance occurrence. The check-in will be retrospectively performed as an opportunity and a possible invitation, and the recipient will be enacted with a specific kind of situated identity, oriented towards emergence and chance opportunities. Both readings are often simultaneously available, and being a native member of the Foursquare community used to living inside mobile social media means being endowed with the competence to recognize which reading to apply and how to produce a proper response based upon such a reading. This is also exactly where the poor Mathieu PetitJean failed. By systematically reading check-ins as obliging speech acts, he did not display his competent attunement to the pragmatic looseness and ambiguity that is inherent to Foursquare location check-ins, and to the experience of being a competent member of the Foursquare community of interpretation.

Relational Pragmatics: Check-Ins and the Enactment of "Weak" Bonds

Social encounters perform and mold relationships. The ways check-ins are treated and by whom, and the kind of encounter that may follow or not, are constitutive of the kind of social networking dynamics such mobile applications enact and support. A typical Foursquare story surfaces in the interview extract below, making visible how the use of such mobile applications may constitute a nexus for the performation of a particular kind of sociality.

Extract 1:

A: I am skateboarding and I am going to the local skatepark, in my neighborhood. I post on Twitter and that way some people

> *I know vaguely from Suresnes come and join me.…I share my location and I send on Twitter, "I am at the skatepark in Mont Valerien now" and acquaintances I haven't seen for months, they come.*
> *Q: Do they warn you in advance they will come?*
> *A: Er, no, but there's a good feeling afterwards. It's people that I haven't seen for months, as I told you, then it's cool, like: we are talking.* (Yacine, 19 y.o.)

This story and the way it is designed emphasize just the kind of pragmatic looseness we have recognized as involved in the production and recognition of location sharing as a kind of social action. The initial account posits a temporal succession between two events: location-sharing and the arrival of others. Both actions are nevertheless connected first on the grammatical level, through the connector "and," and pragmatically, through the use of direct reported speech for the check-in, which provides an allegedly accurate rendition of the way the location was shared, and endows it with some evidentiary status (Tannen 1989; Holt 1996). Indeed, the design of the reported location check topicalizes a location that is not only a public place, but also an activity (skatepark), which may routinely and openly be accomplished there. It may therefore be read as an opportunity to come and join in the skating (which would retrospectively turn the sharing into an invitation). However, the reported location check is also framed as a neutral assertion about one's location, a design which, at least in appearance, neutralizes the expression of intentionality on the part of the location sharer. It is apparently left to the recipients to determine whether they will come to talk and skate. The story itself reinforces this loose connection: by providing only a grammatical connection (through the link "and") between these two actions, that is the location sharing framed as a linguistic event through direct reported speech, and the arrival of others. It is therefore left to the reader to interpret the relative meanings, intentions, and distribution of agency involved in these different actions and their entanglement. What is neutralized and minimized in the story is the performativity of the check-in, the sense that it might enact mutual obligations between the location sharer and the potential recipients (as a more "traditional" and explicit invitation would).

Such a minimization operates both from the point of view of the participants, whose actions are accounted for, and from the point of view of the recipient of the story itself.

But then, who actually arrives on the scene? Or, more accurately, whose arrival is noticeable enough to be talked about in this story, which is itself set in an interview about the uses of Foursquare? *"Acquaintances," "people I haven't seen for months."* Others may come, too—either strangers or very close friends—but it is the arrival of these mere acquaintances the story makes significant. It is posited as providing both the value of the Foursquare experience and the gist of the anecdote, by allowing the renewal of the underlying relationships: *"then it's cool, like: we are talking."* In social network analysis terms such acquaintances, which one does not see very often and which are organized around a specific activity, constitute a form of "weak bond" (Granovetter 1973). And, of course, one will feel a looser sense of mutual obligations with weak bonds than with strong ones, close family and friends; one commonly given member's definition of the latter being someone whom we may turn to for help at any time of the day or night. In other words, the point of the above anecdote is to establish the value of Foursquare in the enactment and support of weak bonds. The pragmatic looseness of the check-in is a plus in that respect, for it resonates with the relational looseness of the weak bonds themselves. Because one is less tightly tied with weak bonds, a directly addressed invitation "out of the blue" might be somewhat irrelevant. Weak bonds seem to be more properly maintained through the provision of less obliging occasions and opportunities. Location sharing, and more generally the use of Foursquare, may thus appear as a privileged resource to awaken, enliven, and maintain weak bonds.

Closer friends with whom one is bonded by mutually obliging strong ties may be led to perceive check-ins differently. An interviewee reported that some of his close friends might get angry should they not be personally invited when they see him check into a restaurant, for instance. *"It's a sure thing there will be one [friend] who will complain [after a check-in] by saying 'Why didn't you invite me?' etc. Me, personally, if I see that someone is close, usually I call him to say, 'Listen, let's meet if you feel like it, hey?' on the phone."* For close friends, location check-ins might not be perceived as proper invitations, because they are not clearly addressed enough and

not obliging enough (which involves playing on a sense of strong mutual obligation which is taken as a pervasive background and resource for strong bond interaction). Close friends expect more from an invitation than simply being told where one currently is. So to somewhat repair for this, the user we quoted here elects to call his friend in order to actively provide an addressed, explicit, and "real" invitation over the phone (again quoted in a form of direct reported speech in the interview extract above: *"Listen, let's meet if you feel like it, hey?"*). Two types of expectations are combined here: first, that to be faithful to the strength of a strong bond, a proper, direct, mutually obliging form of invitation needs to be produced, of the kind that may be enunciated in a direct conversation or a letter (or messaging technologies with explicit addressing system). Just letting a location become available to be picked up by anybody is not deemed to display enough personal commitment. Second, we are coupled to strong ties by an active and multilayered communicative apparatus, which means we must meet them, call them, or exchange messages with them frequently (Licoppe 2004), so that there should always be an opportunity available to "invite" them more directly. Because with closely related recipients there is always the possibility of issuing alternative and more committing forms of invitations on other channels, it becomes possible for such recipients to read location checks as inadequate forms of invitation that fail to honor the sense of mutual commitment they have come to expect from invitations between friends. All this does not mean that close friends will always complain or refrain from treating a location check as an invitation. But the fact that, from time to time, they might complain shows that a mere location check may be perceived as failing to respect the moral and communicative expectations that are built into the kind of relational closeness that characterizes strong ties. Location checks are too loose and too weakly obliging to enact and maintain the relational dynamics of strong ties.

At the other end of the relational spectrum, we have the case of mere strangers. For, particularly if one has not implemented strong privacy settings, one's location checks may be available to and seen by complete strangers. Where complete strangers are involved, something more is required to support an encounter or an account for its initiation, such as reacting to original and invented place

names to which the check-in refers, or competing to become the "mayor" of a particular Foursquare place (Lindqvist et al. 2011). Close proximity is also a powerful resource, since "discovering" that one is close to someone else generally legitimizes an encounter with them, whatever the type of interaction, whether in phone calls (Licoppe and Morel 2013) or with location-sharing social network applications (Licoppe and Inada 2010). The latter just makes such occurrences more common. In brief, the closer, spatially, users realize they are to each other, the more such mutual proximity may warrant or project an encounter, even with strangers. However, even in that case, some Foursquare users declare themselves wary of treating location notifications straightforwardly as opportunities to meet, such as this student user speaking of a particular, publicly accessible place he created in Foursquare, a lawn on his university campus (*"la pelouse de Nanterre U."*): *"I am looking who is there and whether it's someone I know. Bah, if for instance, I see someone's there and I know she's close I will not go and see her or at least we have to be minimally acquainted, like having exchanged glances or passed one another in the university buildings or, er…"* (Yacine, 19 y.o.). The background expectation here is that at least some degree of weak acquaintanceship is required to treat location checks as opportunities to interact.

However, the same user found it normal that two other student users he did not know got in touch with him when they noticed on Foursquare that he had checked himself in there, on that lawn, where they were also staying. Interestingly, some kind of weak relationship is described as having developed from there.

Extract 2:

A: Right, we speak about this and about other things. We talk loosely about social networks and then about the university.
Q: And these persons you met in this way, did you see them again?
A: Yes, yes, I see them again, on the lawn, at the cafeteria, but we are not, we are not very close. We talk a bit and that's all. It's short, like, if we see one another from time to time, if we see one another, that's cool, but we won't, it's not a friendship, either. …It's not very long, either, we don't spend afternoons together.

Q: Do you follow them on Twitter?
A: Yes, I am actually interested in them. Maybe it's afterwards that it may develop into a friendship or…but it has not happened to me yet with respect to people at the university."

Once they have noticed one another on Foursquare and met a first time (an encounter between strangers which was warranted by their co-location and mutual proximity), they have become acquaintances who can meet again on the same lawn, either directly or through Foursquare. The lawn itself is reshaped: from an anonymous public place, it becomes a kind of "third place" in which Foursquare users may randomly meet when they are made aware of their mutual proximity through the mediation of the mobile application and go on meeting there occasionally. The whole account emphasizes the weakness of the social bond which develops in this way (though without excluding completely the rare possibility that such a Foursquare-supported encounter between strangers might turn into a "real" friendship; that is, a strong bond). Their encounters are random and unplanned, there is no mutual obligation to talk or meet, conversations are short and deal with "safe" topics of common interest in this setting, that are not too "involving" tied to their shared identities as students and mobile social network application users. So what seems to be the standard course of development for Foursquare-supported encounters between strangers is the transformation of fleeting encounters into weak bonds.

To sum up, producing and recognizing a check-in as an invitation indexes an intermediate domain in the social network, made of acquaintances, diffuse relationships, and weak bonds. This is not to say that a close friend or a complete stranger may not notice a check-in and initiate an encounter on that basis. However, for the former, it is only one of the ways an invitation to meet might be produced; for the latter, such a treatment of the check-in has to be supported by other resources, such as a high degree of spatial proximity. It is rather that Foursquare is perceived as a resource particularly adapted to, and salient with respect to, the performation of a network of weak ties, which may or not pre-exist the uses of Foursquare, but which are highlighted, enacted, made

vivid and relevant as weak ties in the treatment of the location sharing as an invitation, and the social encounter which ensues. Weak bonds involve a loose sense of mutual obligation. Weak bonds are not the first we turn to or are expected to turn to in times of need, and this looseness may be exploited strategically. For instance, Greg Matoesian provides an example of a rape trial lawyer trying to discredit the victim by playing on the fact that she turned to a mere acquaintance for support after the rape (Matoesian 2001), while Harvey Sacks discussed how an implicit hierarchy of the categories of the people we may successively turn to when feeling suicidal is a resource in the management of phone conversations in helplines (Sacks 1967). A loose sense of mutual obligation is therefore constitutive of weak bonds, and it also resonates with that sense involved in check-ins and the ways they might be noticed and treated as warranting a social encounter.

Conclusion

To gain an understanding of what it means to live "inside" or "in the midst of" mobile social information, we took the example of a location-sharing social network application and its uses. In order to experience the kind of "hybrid ecology" that develops through recurrent engagement with Foursquare, users need to cope with frequent notifications through which other users make their location visible, and also to publish their own location. My research strategy consisted in operating a pragmatic move in which location checks were no longer (just) considered as the provision of a piece of information but as a social action (and more specifically a special case of written speech act embedded in screen-based media), and in displacing the analysis away from the motivations of "location checkers," as had often been the case in previous, psychology-inspired studies. In this study, the focus of the analysis was on how potential recipients could either ignore such events or treat them as invitations warranting an encounter, the propriety or the impropriety of such responses constituting a joint accomplishment with the users involved. Trying to understand location checks as social actions from a pragmatic perspective allows us empirically to gain an insight into part of what the experience of dwelling in a Foursquare-augmented environment might be. Being a competent

member who is well socialized in the Foursquare community precisely involves recognizing location notifications as particular forms of social action and acting upon such a recognition in an accountable way.

Location checks are produced and recognized by potential recipients as a particular sort of speech act, described by users as "invitations." However, location checks entertain only a family resemblance with invitations: while their lexico-grammatical design is that of a factual claim, they may be selected by potential recipients as opportunities to initiate an encounter, thus displaying a retrospective understanding of the initial location check notification as an "invitation" of sorts. Moreover, users look upon them as special kinds of invitations, ones that are loose and "global": loose in the sense that they seem to minimize the intentionality and agency of their source (they seem to be left there to be seen or not, as chance would have it, so that their production seems less obliging with respect to potential recipients than an explicit invitation in conversation might prove to be), and global in the sense that to whom they are addressed is often left largely unspecified (in their most general and unmarked forms, they are available to any user as allowed by privacy settings). Location checks materialize as apparently random events in potential recipients' ecologies, for them to act upon their understanding of them as possible invitations. Because they are weakly obliging and how to respond to them is largely left to the discretion of the recipient, responses are legible as opportunistic and serendipitous. Intentionality and agency seem mainly distributed between the notification as a semiotic-material event and the recipient's apparently opportunistic treatment of it.

Producing and recognizing a check-in as an "invitation" indexes an intermediate domain in the social network, made of acquaintances and weak bonds, precisely because this domain of sociability entails weak mutual obligations between participants. Compared with explicit and addressed forms of invitation, the way location checks enact loose mutual obligations actually resonates with the way weak bonds are maintained and performed (and much less with the strong expectations of mutual obligations which strong bond sociability might entail). More generally, our analysis of the Foursquare case shows how mobile communication technologies in action may mediate between (a) the performation of connected and

opportunistic subjects and of social action as serendipitous (rather than strategic), and (b) the support, highlighting, enactment and maintenance of weak bonds. With such location-sharing mobile social applications, this deeper connection operates through the pragmatic organization of micro-communicative processes, such as the production and treatment of location checks and their potential treatment as invitations.

The pragmatic type of analysis I have advocated here could be extended to other technological patterns in which discursive events also appear to be weakly obliging and loosely addressed, such as writing a comment on Facebook (and responding to it) or contributing some piece of code on an Open Source Forum. Finally, it must be noted that such microprocesses are also sensitive to larger scale temporal dynamics. For instance, if location-sharing social networks become a large commercial success, with millions of users checking in all the time, it is highly likely that a form of informed and "civil" inattention will develop in which most of these location checks will be left unnoticed.

References

Austin, John L. *How To Do Things with Words*. Oxford: Oxford University Press, 1975.

Brown, Barry, Alex Taylor, Shahram Izadi, Abigail Sellen, Joseph "Jofish" Kaye, and Rachel Eardley. "Locating Family Values: A Field Trial of the Whereabouts Clock." In *UbiComp '07: Proceedings of the 9th International Conference on Ubiquitous Computing*, edited by John Krumm, Gregory D. Abowd, Aruna Seneviratne, and Thomas Strang, 354–71. New York: ACM Press, 2007.

Cramer, Henriette, Mattias Rost, and Lars Erik Holmquist. "Performing a Check-In: Emerging Practices, Norms and 'Conflicts' in Location-Sharing Using Foursquare." In *Proceedings of the 13th International Conference on Human Computer Interaction with Mobile Devices and Services*, edited by Markus Bylund, Oskar Juhlin, and Ylva Fernaeus, 57–66. New York: ACM Press, 2011.

De Souza e Silva, Adriana, and Jordan Frith. "Locative Mobile Social Networks: Mapping Communication and Location in Urban Spaces." *Mobilities* 5, no. 4 (2010): 485–505.

Dewey, John. *Experience and Nature*. New York: Norton & Company, 1958.

Granovetter, Mark S. "The Strength of Weak Ties." *American Journal of Sociology* 78, no. 6 (1973): 1360–80.

Humphreys, Lee. "Mobile Social Networks and Social Practice: A Case Study of Dodgeball." *Journal of Computer-Mediated Communication* 13, no. 1 (2007): 341–60.

Holt, Elizabeth. "Reporting on Talk: The Use of Direct Reported Speech in Conversation." *Research on Language and Social Interaction* 29, no. 3 (1996): 219–45.

Iachello, Giovanni, Ian Smith, Sunny Consolvo, Gregory D. Abowd, Jeff Hughes, James Howard, Fred Potter, James Scott, Timothy Sohn, Jeffrey Hightower, and Anthony LaMarca. "Control, Deception, and Communication: Evaluating the Deployment of a Location-Enhanced Messaging Service." In *UbiComp 2005: Ubiquitous Computing: 7th International Conference, UbiComp 2005, Tokyo, Japan, September 11–14, 2005, Proceedings…,* edited by Michael Beigl, Stephen Intille, Jun Rekimoto, and Hideyuki Tokuda, 213–31. New York: ACM Press, 2005.

Levinson, Stephen C. *Pragmatics.* Cambridge: Cambridge

University Press, 1983.

Licoppe, Christian. " 'Connected Presence': The Emergence of a New Repertoire for Managing Social Relationships in a Changing Communication Technoscape." *Environment and Planning D: Society and Space* 22, no. 1 (2003): 135–56.

———, and Romain Guillot. "ICTs and the Engineering of Encounters: A Case Study of the Development of a Mobile Game Based on the Geolocation of Terminals." In *Mobile Technologies of the City*, edited by Mimi Sheller and John Urry, 152–76. London: Taylor and Francis**,** 2006.

———, and Yoriko Inada. "Locative Media and Cultures of Mediated Proximity: The Case of the Mogi Game Location-Aware Community." *Environment and Planning D: Society and Space* 28, no. 4 (2010): 691–709.

Lindqvist, Janne, Justin Cranshaw, Jason Wiese, Jason Hong, and John Zimmermann. "I'm the Mayor of My House: Examining Why People Use Foursquare - a Social-Driven Location Sharing Application." In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, edited by Desney Tan, Geraldine Fitzpatrick, Carl Gutwin, Bo Begole, and Wendy Kellogg, 2409–18. New York: ACM Press, 2011.

Matoesian, Gregory M. *Law and the Language of Identity: Discourse in the William Kennedy Smith Rape Trial*. Oxford: Oxford University Press, 2001.

Page, Xinru, Bart Knijnenburg and Alfred Kobsa. "FYI: Communication Style Preferences Underlie Differences in Location-Sharing Adoption and Usage." In *Proceedings of the 2013 ACM International Joint Conference on Pervasive and Ubiquitous Computing*, edited by Friedemann Mattern and Silvia Santini, 153–62. New York: ACM Press, 2013.

Tang, Karen P., Jialiu Lin, Jason I. Hong, Daniel P. Siewiorek, and Norman Sadeh. "Rethinking Location Sharing: Exploring the Implications of Social-Driven vs. Purpose-Driven Location Sharing." In *Proceedings of the 12th ACM International Conference on Ubiquitous Computing,* edited by Khai Truong and Paddy Nixon, 85–94. New York: ACM Press, 2010.

Pomerantz, Anita. "Agreeing and Disagreeing with Assessments: Some Features of Preferred/Dispreferred Turn Shapes." In *Structures of Social Action*, edited by J. Maxwell Atkinson and John Heritage,

57–101. Cambridge: Cambridge University Press, 1984.

Sacks, Harvey. "The Search for Help: No One To Turn To." In *Essays in Self-Destruction,* edited by Edwin Schneidmann, 203–23. New York: Science House, 1967.

Searle, J.R. "A Taxonomy of Illocutionary Acts." In *Language, Mind, and Knowledge: Minnesota Studies in the Philosophy of Science Volume 7*, edited by Keith Gunderson, 344–69. Minneapolis: University of Minnesota Press, 1975.

Tannen, D. *Talking Voices: Repetition, Dialogue, and Imagery in Conversation*. Cambridge: Cambridge University Press, 1989.

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7

Synergies between Head-Mounted Displays and Head-Mounted Eye Tracking: The Trajectory of Development and Its Social Consequences

by

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Abstract

In this paper we examine the potentials and limitations of fusing head-mounted computing devices such as Google Glass with head-mounted gaze tracking (HMGT). In the current version of Google Glass, for example, there is no gaze-tracking functionality—instead there is "point of vision" video functionality that captures the broader scene in front of the user. Gaze tracking adds a high degree of specificity to head-mounted computing devices that follows the precise gazing point of the user. We suggest that because of technical developments, HMGT is becoming increasingly mobile and that a likely path of adoption for HMGT will be as a feature

of head-mounted computing devices. We suggest several general applications for this technology. Further, we discuss the potential for head-mounted gaze tracking to become a widely used technology. However, there are several issues that hinder this trajectory. These include issues of privacy (both in the legal and in the ethical sense), the idea of how we present ourselves in the Goffmanian sense, and the difficulties of developing reciprocal expectations for the technology. For these reasons, both head-mounted computing devices and HMGT are likely to remain niche technologies.

Introduction

Gaze tracking has moved from being unwieldy and intrusive to simple and discreet. It has moved from being a technology that is complex to use and reliant on the care and prodding of highly trained engineers and scientists to becoming non-invasive and relatively straightforward to use. It has also moved to become a technology with an increasing number of use areas. This is not to say that head-mounted gaze tracking (HMGT) is a mainline technology. There are, however, significant areas where the technology can enhance data collection and can assist in the execution of important tasks. In this paper we are interested in looking at this technology in the context of head-mounted displays and consider the likely trajectory of development.

As with many other electronic devices, HMGT technology has become smaller and more agile (Hansen et al. 2005). Early in their history, eye-tracking devices often involved elements attached directly to the eye and had the need to stabilize the head by fixing it into place with various frames and straps. By contrast, contemporary eye tracking technology can disappear into simple, lightweight, mobile devices; this development has been seen on many technical fronts. Indeed we are on the cusp of another transition; namely, mobile head-mounted displays that will have the ability to retrieve information and to help us mediate our communication.

It is likely that in the near future HMGT functionality will be compact enough to fit into wearable displays such as point-of-vision (POV) devices, including Google Glass, that replicate an individual's field of vision. The current crop of these devices allows the user to capture video of, for example, a person as they parachute

out of a plane or a law enforcement officer as they go about their rounds. The image captured, however, replicates the broad field of vision and not a particular point of gaze. In many cases, this broader image is what is best; however, we contend that there are also situations where a more specific focal point is also of interest.

There has been limited discussion of HMGT and heads-up displays in the literature (Hansen and Ji 2010). In the work that exists they have been examined as extensions virtual reality and immersive computing (Park, Lee, and Choi 2008) and as a way of apportioning attention (Kurauchi and Morimoto 2013). HMGT has also been examined in terms of its impact on social interaction in a laboratory context (McAtamney and Parker 2006). Thinking somewhat more broadly HMGT-enhanced head-mounted computing devices, such as what we see in the Google Glass project, we will have the ability to further indicate our point of attention and eventually transmit this to others or make it available for later examination. HMGT will tell us, for example, that a user is looking at a specific individual and not a crowd; a certain product in the shelf in the grocery store and not the whole shelf; or a particular part of the PC screen and not the whole screen. This can change the way that we can interact with our environment. In this paper we consider how head-mounted computing devices and HMGT can fuse into a single platform. Because of this development it is likely that HMGT will find new applications. In this process, we also see that it there are consequences in relation to privacy and power relationships (Katz 2013).

We will first go through the development and application of wearable computing, and follow this with a short account of the history and functionality of gaze tracking. We next discuss the melding of HMGT and heads-up display technologies and the potential for using this when it facilitates interacting with information that is embedded in the local context. This touches on issues such as the so-called internet of things. Finally, we look into the eventual applications for HMGT-enhanced wearable displays both in terms of the possibilities and the threats that they represent for at the personal and the social levels.

Head-Mounted Display and Wearable Computing Technology
Technical Development of HMD and Wearable Computing

Wearable devices that enhance our interaction with the world might be traced back to the development of glasses (Kriss and Kriss 1998). Following this line of thought, the watch, for example, was carried on the body (often in a well-protected pocket) from the 1600s (Landes 1983) and in the case of women, on the wrist, often as a piece of jewelry. The wristwatch made its appearance with males during the First World War since it was awkward for pilots to dig out pocket watches (Kahlert, Mühe, and Brunner 1986). Moving to head-mounted electronic devices, earphones have been a part of the technical landscape since the early period of the radio (Howeth 1963) and the idea of a head-mounted display (HMD) was first was patented by Thelma McCollum (1945) and as a stereoscopic television HMD by Morten Heilig (1960). Because of the technical limitations at that time, the idea of HMD was more focused on giving the user a virtual experience by showing a video, not as a "see-through" device that augmented vision. The first video "see-through" augmented reality system was made in the 1960s by the Bell Helicopter Company, which was a servo-controlled, camera-based HMD (Azuma et al. 2001). This provided the pilot with an augmented view captured by an infrared camera under the helicopter that was useful for landing at night. Since the early 1970s, the US Air Force has carried out research on HMD systems as a way of providing their aircrew with a variety of flight information and also a method for interacting with the airplane and user interfaces (Kiyokawa 2007). In the 1980s we began to see the use of HMDs where the user is able to "see through" the device, either optically or based on a video image. The user can see, for example, 3D computer- generated objects superimposed on his/her real-world view. The optical and the video approaches for HMD hardware design merge and superimpose the virtual view onto the real views of the world either via a semi-transparent mirror as with optical see-through HMDs (Berman and Melzer 1989; Buchroeder, Seeley, and Vukobratovich 1981; Droessler and Rotier 1990; Rolland et al. 1995), or via video cameras mounted on the head as with video see-through HMDs (Bajura, Fuchs, and Ohbuchi 1992; Edwards, Rolland, and Keller 1993).

The most recent of HMD project, what we refer to as head-mounted computing devices, and the one that seems to have garnered the greatest general interest, is the Google Glass project that includes an augmented reality head-mounted display. As of this point, Google Glass includes a heads-up display in addition to an embedded POV scene camera, microphone, different types of radio-based communication (Wi-Fi - 802.11b/g and Bluetooth), GPS functionality, an accelerometer and "bone conduction" in lieu of speakers. Voice control is used to operate the device including taking pictures/video, sending messages, getting directions, etc. Google Glass, as well as other smart glasses (e.g., Vuzix M100), show that head-mounted computing devices can potentially be used as a visual interface for mobile appliances; they can become a common display for various tools that we use such as mobile phones, tablets and even laptops.

Applications of the Head-Mounted Computing Technology

Head-mounted computing devices have been used in many different application fields such as: military, law enforcement (e.g., police), civilian (e.g., engineering, medicine, and computer-guided surgery), video gaming, sports, and simulation (e.g., driving and flight). Perhaps the most promising future uses of these tools are those in which the display allows for enhanced virtual environments (e.g., enhanced reality) rather than replacing real environments as in virtual reality (Bajura et al. 1992).

Head mounted displays provide the ability to use context-aware information such as weather reports, incoming text messages, public transportation schedules, route finding, information sharing with others, etc. Additional functionality will likely include pattern recognition perhaps similar to that in Google Goggles that references libraries of photos taken by others in addition to GPS data to search for further information on the item in question.

Gaze-Tracking Technology

Parallel with the development of wearable computing and head-mounted displays, there is also a development in the area of gaze tracking. Gaze tracking monitors and records the point of regard

(i.e., where a person is looking as well as a direction in space) (Witzner and Ji 2010). In this section, we give a short history of the gaze-tracking technology in terms of technical development; next, different application areas of this technology are briefly described. At the end of this section, some of the limitations of the gaze trackers are described.

A Short History of Gaze Tracking

The functioning of the eyes and the interaction between gaze and cognition has long been the subject of interest. The people who have contributed to our understanding of vision include some of the luminaries of science such as Kepler and Descartes (Wade and Tatler 2005), and people have been developing ways of mechanically tracking eye movement for over 100 years (Jacob and Karn 2003). Seen from our remove, many of the early systems were quite draconian. The earliest devices were physical "contact lenses" that were attached to the eye using either an adhesive or suction to hold them in place. These lenses were sometimes attached to a mechanical lever in order to track the movement of the eye; it goes without saying that this hindered natural observations. As Jacob notes, "This method is obviously practical only for laboratory studies, as it is awkward, uncomfortable and interferes with blinking" (1995, 267). An early researcher, Edmund Huey, described his approach to recording the movement of a subject's eyes:

> I arranged apparatus as follows: A plaster of Paris cup was molded to fit the cornea accurately and smoothly, sand-papered until it was very light and thin, and placed upon the front surface of the eye, the cup adhering tightly to the moist cornea. No inconvenience was felt, as the corneal surface was made insensitive by the use of a little holocain, or sometimes cocaine. A round hole in the cup permitted the observer to read with this eye, the other eye was left free. A light tubular level of celloidin and glass connected the cup to the aluminum pointer, flat and thin, which responded instantly to the slightest movement of the system; and, suspended over the smoked-paper surface of a

> moving drum cylinder, the aluminum point traced a record of the eye's movement as the observer read. (*The Psychology and Pedagogy of Reading* pp. 17)

The system of tracking eye movement became progressively less invasive as the technology for observation developed. The use of film cameras eased the burden on (and presumably the irritation of) subjects. Shortly after the turn of the last century, researchers attached a simple "white speck of material" to "the eye of a subject and filmed it as the individual read" (Jacob and Karn 2003, 574). Researchers began to photograph the light reflected from the cornea (Majaranta 2009; Wade and Tatler 2005). In 1901, Dodge and Cline developed what they called the "Dodge Photochronograph" that is seen as the progenitor of today's eye reflection tracking systems; these have since dispensed with attaching anything to the eye (Judd et al. 1905). This is not to say, however, that the gaze-tracking systems were not bulky: they might take up whole sections of the laboratory. Buswell's 1935 device, for example, was a rambling collection of tubes, monitors, electronics, struts, lights, and frames with which to stabilize the subject's head. It filled a large desk and spilled over onto area behind, and it was nothing if not voluminous (1935).

As with many other areas of research, the rise of computerization dramatically changed the way we were able to gather and analyze gaze information. The equipment for tracking eye movement has undergone a radical reduction in size and devices have seen a similarly radical increase in processing power, accuracy, price and responsivity. With time, researchers developed head-mounted devices that allowed the subjects greater freedom of movement (Jacob and Karn 2003).

Early eye tracking systems used retrospective analysis of film or other recording material. Starting in the 1960s computers gave researchers the ability to digitally gather gaze tracking information, process the data, and provide feedback in real time (Jacob and Karn 2003). These developments mean that gaze trackers can be used as a computer-pointing device; they can also be used for sending commands (e.g., making selections on a screen).[1]

1 Dwell-time selection, eye blinks, gaze-gestures, and context switching have been typical ways of extending the capabilities of eye trackers for gaze-based interaction. Gaze as a pointing modality can also be used together with some other

Gaze interaction with computers has, until now, mostly been applied to the situation of a single, stationary user is sitting in front of a screen. It has used a camera, often mounted on or near the PC screen, to first calibrate and then to track the user's gaze (a remote eye tracker). Recent work has moved in the direction of head-mounted devices that are increasingly mobile and where, as the name suggests, the camera that captures the individual's eye movement is mounted on the person's head using either a helmet, a headband, or glasses (Ishiguro et al. 2010; Mardanbegi and Hansen 2011; Toyama et al. 2012). This has extended the domain of gaze-based interaction into the mobile situations that allow the user almost complete freedom of head movement as well as mobility.

Compared to the previous generation of gaze trackers, HMGT devices afford an unheard of degree of mobility. The developments in camera technology and miniaturization mean that it is now possible to move away from the desk-bound notion of eye tracking. Indeed, we are entering a period where head-mounted eye trackers have become much smaller, lighter, and thus easier to integrate with other mobile devices. Further, the integration of a variety of input possibilities (gaze, haptics, gestures, etc.) means that HMGT is becoming more flexible and more suitable for mobile, gaze-based interactive applications.

HMGT is currently at a stage where size and quality allow seamless integration of eye trackers into normal glasses. HMGT software is, to a large extent, also equal to an increasing number of gaze tracking tasks.[2] As we will discuss below, this also expanded the areas of use of gaze tracking.

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interaction modalities such as body gestures and speech. Eye-based head gesture is a novel technique for enhancing gaze-based interaction through voluntary head movements. Gaze and head gestures measured by these trackers provide a gaze-based method for interacting with computers and objects in the environments.

2 We currently have cameras that are only several millimeters in size. In addition, the use of infrared light sources in glasses mean that glasses-mounted eye trackers are not a significant technological challenge. Clearly, several issues remain that will improve eye trackers even further (e.g., the ability to handle large and rapid light changes). A general problem for most current trackers is their need to be calibrated to the individual. While this is a current problem with most commercial eye trackers, there exist several possible techniques that could limit explicit per session calibration (Witzner, Hansen, and Ji 2010).

Gaze Tracking Applications

Gaze tracking applications can broadly be divided into two categories: *diagnostic applications*, where the eye tracker provides objective and quantitative evidence of the user's visual and attentional processes or neurological disorders (e.g., identification of neurological disorders by studying the diagnostic data provided by properties of saccades and fixations, and applications in psychology, cognitive linguistics, and product design), and *interactive applications*, where the eye tracker is used as an input device of an interactive system, and the system responds to the user's gaze (Duchowski 2007).

Diagnostic Applications

The earliest questions that used gaze tracking considered the interaction between gaze and tasks such as reading and looking at a picture. The research questions revolved around the interaction between vision and comprehension. Yarbus and Riggs (1967; see also Buswell 1935), for example, recorded people's gazes as they looked at an image when there was no particular task required of the viewer, and then when the viewer was asked to retrieve different types of information from the image (i.e., the number of people in the image or the type of clothes they are wearing). In other cases, gaze was recorded when people were asked to synthesize information from the image such as the class status of the people. In each case, Yarbus and Riggs recorded different patterns of eye movement.

Eye tracking has also been used when examining how people read (Rayner 1998). Just and Carpenter, for example, have used eye tracking to measure the time (in milliseconds) that subjects looked at words in sentences (1980). They suggest that the time to integrate gaze and comprehension depends on the frequency of a word's general use and its thematic importance; there is also a pause at the end of a sentence. The research also shows that eye movement differs when a person is reading aloud or silently. In addition, the research has indicated that as the complexity of the material becomes more difficult, we spend a longer time on each word and have a narrower field of focus (Duchowski 2007).

A similar application has been to study the use of gaze in how people carry out everyday tasks, such as simple food preparation, and how people handle different situations that arise in driving in traffic (often examined using driving simulators). In the case of the simple tasks, the research has been concerned with the role of gaze when going through a sequence of actions. The findings show that the subjects gaze will often presage the next physical action: when we are making a sandwich we look at the butter immediately before we move our hands to retrieve it. In the case of driving, while this is a dynamic situation as compared to the static analysis of reading or viewing a photograph, it has a common thread in that gaze tracking is used to understand the how the eyes focus on certain things and perhaps ignore or overlook other items that may also have importance.

Gaze tracking has also been applied to usability studies. In a classic study, Fitts et al. (1949) used a film camera to record the gaze of pilots as they landed airplanes. This has been extended later with other dimensions of flying (Duchowski 2007) to better understand where to place the instruments. This type of research has been applied to other arenas as well. Researchers have been interested in understanding, for example, the best arrangement of items on a web page or in printed material. It is often the case that the diagnostic applications have not relied on real-time feedback. Rather, the data is captured and analyzed later.

Another area of research has been to control how people carry out various types of visual analysis. This includes questions of, for example, X-ray inspection by doctors, production control inspection, and photo interpretation (e.g., in the case of astronomy or national security).

A question that has been broached in this context is the connection between seeing and cognition. According to Jacob and Karn:

> Psychologists who studied eye movements and fixations prior to the 1970s generally attempted to avoid cognitive factors such as learning, memory, workload, and deployment of attention. Instead their focus was on relationships between eye movements and simple visual stimulus properties such

> as target movement, contrast, and location. Their solution to the problem of higher-level cognitive factors had been to ignore, minimize or postpone their consideration in an attempt to develop models of the supposedly simpler lower-level processes, namely, sensorimotor relationships and their underlying physiology. (2003, 575)

Perhaps as an attempt to address this issue, the next step in this line of research was to combine eye tracking with brain activity as recorded with Functional Magnetic Resonance Imaging (fMRI). This development has provided us with a new tool with which to study the interaction between reading/looking and cognition. The research generally shows the correlation between eye fixation and brain activity (Duchowski 2007). This approach allows us to better understand the way that cognition works as we access different types of information in our brains. A related question is the interaction between vision and cognition for populations that are not able to communicate or have only fundamental communication capacity,: newborn babies, for example (Johnson et al. 1991). The research has investigated how newborns fixate on various shapes such as images with faces vs. more abstract images, providing insight into the bonding process.

Interactive Applications

As noted above the development of computing capacity meant that gaze tracking provided for immediate feedback. This led to the use eye movement as a pointing device for computer-based user interfaces. The most common application of this capability has been to allow disabled persons who cannot use their hands to control a mouse or keyboard (Handa and Ebisawa 2008; Hutchinson et al. 1989; Jacob and Karn 2003; Majaranta 2009). Indeed, this has been one of the most central applications for gaze tracking heretofore. The coming development of more compact HMGT devices will likely see its application in other interactive situations as noted below.

We are now seeing that the gaze tracking devices are becoming smaller, priceless expensive, more robust, and less in need of the careful goading and maintenance of engineers and scientists.

Further, they are no longer leashed to large computing devices. This means that the uses of gaze tracking can move into more natural settings, and thus we can begin to consider a broader range of applications. In addition to the traditional uses of cognition research, usability studies, and as aids for disabled persons, it is possible to develop gaze-tracking applications for more quotidian purposes. This is a discussion to which we will return below.

The Synergies of HMGT and Wearable Computers
Limitations of the Head-Mounted Display/Computer

The current implementation of the Google Glass, as well as various POV "action video cameras,"[3] have the ability to capture, in a broad sense, what the individual is looking at. Many of the head-mounted devices replicate the users' field of vision. However, the field of view for these video-based applications (often about 170 degrees) is broader than our active field of vision (which is about 135 degrees vertically and 160 degrees horizontally) (Wandell 1995). However, the most sensitive part of the eye is actually a small part of the total organ, and the field of vision is divided into three different areas of differing sensitivity and clarity. In order of decreasing clarity there is the fovea (about one to two degrees of vision), parafoveal (about three to five degrees), and peripheral region (everything beyond about six degrees). The foveal area is our major source of visual information, as the peripheral area is only able to register movements and contrasts as it has very poor visual acuity.

When we are looking at a scene before us, we focus on only a small portion of the total information; we continually scan a scene in order to gather further information. In some cases we can move our attention to the peripheral areas of vision, albeit not with the same natural ease. Within the brain a large portion of the cerebral cortex is devoted to processing the visual information from the foveal area. Thus, the wide frame captured by a many POV video system does not map onto our foveal-intensive vision.

3 These include for example the GoPro, Contour+, Ion Air Pro Drift HD, Panasonic HX-A100, AXON flex, and car-mounted video devices. An increasing number of other devices are moving into this space.

The Affordances of the Current HMGT

As we have noted, it is technically possible to have head-mounted eye trackers integrated with a POV scene camera can indicate the point of gaze. Additionally, we can use computer vision techniques for recognizing the objects in the scene and also for reconstructing the environment around the user. When the apparatus is attached to the user's head, it is also possible to know the direction and the speed of the movements of the head.

Gaze tracking can provide an abundance of information about the subject and their environment. This can include personal information (such as their focus, reading capabilities/content) as well as the general insight into the things and images that they visually dwell upon. The eye image recorded by today's gaze trackers can be used for measuring the eye movements and fixations[4] (Jacob and Karn 2003). In addition, the technology can also provide other types of eye-based information such as the pupil diameter (e.g., as an indicator of the cognitive load), different eye features like iris pattern (e.g., used as a biometric), the frequency of blinking, the behavior of the eye muscles (e.g., as one of the indicators of the user's fatigue) (Singh, Bhatia, and Kaur 2011), and the reflection of the environment on the surface of the cornea. In addition, the vestibulo-ocular reflex that coordinates eye movements relative to head movements makes it possible to even measure changes in head rotations (roll, tilt, and pan) through the eye movements (Mardanbegi, Hansen, and Pederson 2012).

By looking at the future interactive applications of wearable computers, and different ways of interaction with the head-mounted graphical user interfaces, we see that gaze as a pointing mechanism will likely be an early functionality to head-mounted computing devices. In addition, speech and gestures will also likely be added as mechanisms for sending commands (e.g., doing selection) and enhancing communication. Other technologies such as haptic, accelerometers, electroencephalography (EEG), and perhaps other biosensors may also be used to give more functionality to wearable computers.

4 For example, the number of fixations, the amount of time in each area, the number of times returned to a point, etc.

Applications of Gaze-Enhanced Head Mounted Computing Devices

There is a wide range of applications that are possible with gaze -enhanced, head-mounted computing devices that would allow for extremely detailed interaction between users. Indeed, when the gaze of one person is transmitted to another, the second person could specifically understand what the first person is looking at and, by inference, where their attention is directed.

Using this functionality a technician, for example, could call to a remote expert and be "talked through" exceedingly detailed procedures. Gaze-enhanced devices could be used when teaching people to react to visually specific clues (e.g. the investigation of X-ray images or when learning to drive). It is also possible to conceive of these technologies being used to deploy and direct remotely located workers across a broader geographical area. Gaze tracking could facilitate the logistical systems of delivery people, who could visually check the stocks of items on the shelves. Gaze-tracking systems could "check off" the QR codes of the existing stock and compile a list of needed items and flag those that are out of date. Shared gaze tracking could help us assist one another in focusing in on relevant (and very detailed) information when navigating in unfamiliar areas. Alternatively, if an individual were lost he/she could track on a sign showing the name of the street (or perhaps another sign such as a local restaurant) and this would help the system locate the individual.

HMGT and heads-up display technology has many applications for individuals. Further, combining head-mounted computing devices and HMGT, we also move beyond applications for single individuals. As with many other technologies, we suggest that the first users will likely be larger institutions, particularly those where there is a need for central coordination and mutual understanding of one another's situation. With time, we suggest that the technology will be further diffused for use by less formal social clusters, such as families or groups of friends. The technology will allow us to enhance the interaction between individuals since it provides for real-time updates of our social situation. That said, the likely areas of adoption will be niche applications in the near future. This is a theme to which we will return below.

Social Consequences of HMGT and Digital Artifacts

As noted above there have been several phases in the development of gaze tracking. These have included the basic understanding of eye movement, the application of this basic understanding to both the study of cognition and to usability and, most recently, the use of gaze tracking with live video and sophisticated computing power to control computers. We are now entering a phase when gaze tracking is moving out of the sheltered environment of the laboratory and moving "into the wild" (D. W. Hansen and Pece 2005). As noted above, the devices are becoming easy enough to use that they can be imbedded in other head-mounted gadgets, such as POV video devices and heads-up display units. The technology is available—this means that HMGT is becoming available for the development of a variety of applications that were not possible when it was bound to specific locations by the bulkiness of the equipment.

However, the very mobility of the equipment also means that there are several new uncertainties that arise. These include the qualms of privacy and the issues of recording the social interactions. In addition, there are questions focusing on the degree to which HMGT will become embedded in the structure of social interaction.

Privacy and Legal Issues of HMGT

The head-mounted POV scene cameras are a common element in computing glasses with HMD (e.g., Google Glass) just as they are common in head-mounted gaze trackers. The privacy issues of the HMGT are, on the one hand, associated with the scene camera and on the other hand, related to the gaze data and the information that the eyes can reveal (e.g., of a personal nature).

Use of video equipment raises question with regards our rights to gather photographic information and being photographed (Mann 2013). The use of photographic equipment is well trod: as soon as photography became common the question of our right "to be let alone" was an issue (Warren and Brandeis 1890). Warren and Brandeis wrote in 1890 that "Instantaneous photographs . . . have invaded the sacred precincts of private and domestic life; and numerous mechanical devices threaten to make good the prediction

'what is whispered in the closet shall be proclaimed from the housetops'". The context in which Warren and Brandeis were discussing privacy was an era when photography was largely practiced by professional news photographers, previous to the popularization of smaller personal cameras, and more than a century before digital photography became standard. With time, the development of closed-circuit television and a variety of other digital recording systems adds unheard of dimensions to "shouting from the housetops." In many cases, however, there has been and continues to be a power differential between those who record and those who are recorded. It is the local convenience store and gas station that has the security cameras, and these were used in the context of protecting their private property. The ability of individuals to record material in these private settings is different from the right of the property owner to do the same. This question has been brought into the public discussion by the so-called McDonalds incident with Steve Mann. In short, Steve Mann entered a McDonald's in France wearing his "eye tap" (Mann et al. 2005). The eye tap is, among other things, a forward-mounted video camera set in a glasses frame, wherein the video camera covers one eye. According to Mann's version of the incident one of the employees tried to tear the glasses off his face and Mann was eventually pushed out the door.[5]

Among the other issues that the incident touches on, there are issues are associated with who is allowed to capture video in a particular situation. In the case of the commercial establishments, they often have the right to possess surveillance. Also, since it is considered their domain, they can, to some degree, set other conditions with regards who they will serve. Clearly the incident raises the question of the conditions for video capture both on the part of establishments as well as with customers. The incident has been couched in terms of power to surveil and be surveilled as a function of power. A somewhat parallel query arises with the equipping of police with eye-mounted video cameras as in Rialto, California.[6] In this case, the local police department realized a major

5 http://www.slashgear.com/broken-glass-father-of-wearable-computing-allegedly-assaulted-17238802/

6 http://www.nytimes.com/2013/04/07/business/wearable-video-cameras-for-police-officers.html?_r=0

reduction in the number of complaints against officers. There is the idea that words and comments are no longer ephemeral, but now they have become a digital artifact. How is this data being collected, stored, and used? HMGT in public situation adds a new and untested dimension to this issue.

There is, however, another issue associated with eventually wearing a digital recording device in the normal flux of daily life (as seen in, for example, the idea of Memex, MyLifeBits and in so called lifecasting) (Gemmell et al. 2002; Mann 2013); namely, it imposes a dimension on the situation that has not hereto been a part of our understanding of a social situation. A tacit idea associated with social repartee is the idea that the interaction is not recorded, it is ephemeral. The imposition of a record on the interaction eventually changes the way that we are willing to commit ourselves to the situation, and raises the specter of being accountable for our comments and our actions in a way that we are not accountable when they are fleeting.

HMGT in natural settings ratchets up the issue of privacy to yet another level since the technology not only records what is happening in a particular situation, but where the gaze of one of the actors in the situation is resting at any given moment. To be the subject of others' digital gaze and to know that it is recorded means that the scene takes on a different social character. Even though photographing (or tracking gaze) in public places is not illegal, it raises ethical issue and it challenges our notions of privacy. In addition, the ability to capture gaze changes our heretofore-private behavior into a documented event. I could eventually be held responsible for my comments, actions and gaze in a way that was not possible before.

In some ways this might be simple embarrassment that we are caught looking at things better left undisturbed by our glance. However, our use of HMGT record could incriminate us. If, for example, the gaze tracker recorded a car accident it might show that I was adjusting the radio or texting at the time of the crash. HMGT can provide important feedback to a driver such as monitoring eye activity and sensing when they are in need of a rest stop. However, gaze tracking could also be used against a driver if it finds that their gaze was not on the appropriate place when they were involved in an accident. Further, if they showed that I continued to drive

even after my HMGT device found I was drowsy; it might also make me culpable. Thus the technology has implications for the apportionment of responsibility.

Following the work of Goffman, significant parts of social interaction take place in guarded settings (Goffman 1959). The documentation of these would violate our sense of the situation at many levels. It would, in a sense, formalize that which up until now had been informal. The resistance to this development would likely hinder the eventual adoption of HMGT and, for that matter, head-mounted computing devices.

There are yet other dimensions to this issue: HMGT could eventually record the individuals we see or the items we look at in a store. In this latter case, the collection of QR codes that we gaze at can be valuable information for marketing purposes. The question then arises as to ownership of that data and how that data might be used by marketers to form a profile of the individual. Since HMGT is far more specific than simple POV devices (or GPS information) ownership and use of the information presents an important unsolved issue. Thus there are potentially some difficult unresolved questions that need to be settled.

HMGT as a Social Mediation Technology

Another issue associated with the eventual development of HMGT is the degree to which it can become embedded in the flux of social interaction. There are a range of technologies and systems that take on dimensions of being Durkheimian social facts (Ling 2012). Mechanical timekeeping, telecommunication, and dimensions of the internet can been seen in this context on a broad social level. In addition, in more restricted groups, technologies such as calendaring systems and, in its time, the network of fax machines, are examples of social mediation technologies (Ling and Canright 2013).

There are many characteristics that are common for these technologies, including their critically large number of users, their supported adoption by an ideology that legitimates their position in society (we feel safer by having a mobile phone with us), their arranging the social landscape to the exclusion of alternative systems that provide approximate the same function (e.g., the

clock displacing the sun dial) and perhaps most importantly, the reciprocal expectation that others will also either operate based on the edicts of the system (everyone needs to respect time and timekeeping) or be mutually available via a particular mediation form. This is not to say that all technical developments become social mediation technologies—there are many that have become thoroughly embedded in society in spite of not being used for social mediation. Refrigeration is an example of a technology that has made dramatic changes in the social ecology. It is not, however, used for the mediation of social interaction.

The question here is whether HMGT (or for that matter, head-mounted computing devices), will become a technology of social mediation. It is indeed difficult to make the case that this will happen. As we have noted there is undeniable functionality that is provided by HMGT, and the trajectory that is perhaps most likely is that HMGT will be implemented in a future heads-up devices. In this course it will be developed for special applications such as remotely mediated group work where the detailed knowledge of one another's focus is important (i.e., coaching of detailed repairs). It might be that teams of repair personnel could be linked to one another as they carry out a distributed repair task and can thereby interact with one another to facilitate their common work. It might be that we use gaze tracking when discussing detailed co-editing of documents with one another so that we can tacitly see where our co-authors are looking. Other applications might extensions of the inspection functionality noted above—where, for example, delivery people will need to gaze at particular points in a store where they deliver products to insure that they are displayed properly.

This suggests, however, that video recording (and also the more specific use of gaze tracking) may find a niche when used in formalized settings for well-defined purposes. When thinking of personal uses of HMGT it is possible to imagine people using gaze to access specific types of information in specific setting. It might, for example, be useful to have detailed gaze tracking while shopping so that we can read in barcodes or QR codes to gather information about products like their nutritional value as compared to our favorite diet or, eventually, that the item is on sale at a store down the street. As noted above, however, there are a variety of questions that need to be addressed before this is universally accepted.

Still, it is more difficult to understand how either HMGT or head-mounted computing devices will quickly become a part of the general flux of social interaction. While there is a begrudging acceptance of surveillance in society and there has been the development of sousveillance (i.e., people below observing those above), there is not a major discussion of what is termed "veillance" where there is not a power differential between the individuals involved. This has been a sphere based on trust and forgiveness. The insertion of digital recording and, more specifically, gaze tracking into this context will likely not be as simple as it raises a broader set of questions (McAtamney and Parker 2006). The point here is that HMGT *can*, and likely *will*, become a part of the broader digital landscape, but that the first applications will not be associated with social interaction but with commercial situations.

In a similar way, we will also likely develop norms of when we are explicitly NOT looking at the activities of others. These types of processes were seen with the adoption of the mobile phone (Ling 1997). We will develop the sense that it is not appropriate to have on our HMGT unit when another person is using their PIN code. We may need to have a function that shows the recorder is not on, or we will take off the HMGT device much as we take off sunglasses, as a sign of courtesy.

Conclusion

In this paper we have considered the eventual melding of HMGT with heads-up display technology, and we see that heads-up devices are moving into the diffusion process. The commercialization of devices such as Google Glass indicates that there is a certain interest in this direction. At this point, HMGT and heads-up technology are two separate threads of development.

HMGT technology is technically available. The cameras that will provide for gaze tracking, the computing capacity, and the batteries are already available. It is very possible that gaze tracking will become a feature of head-mounted computing devices such as the Google Glass. This may well come as a part of the "feature creep" that is often associated with these types of gadgets. Thus, rather than being seen as a separate technology with its own trajectory,

we suggest that it will be included in the eventual development of wearable computing.

We will certainly see that it is applied to various types of "niche" applications such as those noted above. We suggest that the possibilities afforded by the integration HMGT and HMD will allow efficiencies in various use situations. In a variety of commercial settings the functionality provided by exact gaze tracking will be able to make a contribution. It is also possible to imagine implementations that integrate the gaze point of the individual inspector or worker into a larger system of quality control. In addition, it is clear that HMGT and HMD can be useful in situations where careful inspection is necessary. In addition, they have the ability to make a contribution to different types of research.

That said, the technologies must face a significant social threshold. As noted above, the introduction of recording technology to what is largely seen as ephemeral social interaction violates what Goffman saw as the guarded nature of social settings. It would lead to more caution in our willingness to commit ourselves to the setting and it would also, perhaps, provide the raw materials for others to parody the ways we present ourselves.

Because of these considerations we suggest that the maturity of the HMGT technology will mean that it is easily integrated into head-mounted computing devices; these will likely find a variety of innovative applications. However, we must be sober in our suggestion that these technologies will be used in a wide range of informal social settings.

References

Azuma, Ronald, Yohan Baillot, Reinhold Behringer, Steven Feiner, Simon Julier, and Blair MacIntyre. "Recent Advances in Augmented Reality." *IEEE Computer Graphics and Applications* 21, no. 6 (2001): 34–47. doi:10.1109/38.963459

Bajura, Michael, Henry Fuchs, and Ryutarou Ohbuchi. (1992). "Merging Virtual Objects with the Real World: Seeing Ultrasound Imagery within the Patient." *ACM SIGGRAPH Computer Graphics* 26 (1992): 203–210. [Accessed 26.2.14] http://dl.acm.org/citation.cfm?id=134061.

Berman, Arthur L., and James E. Melzer. Optical collimating apparatus. US Patent 4,859,031, filed August 3, 1987, and issued August 22, 1989.

Buchroeder, R. A., G. W. Seeley, and D. Vukobratovich. "Design of a Catadioptric VCASS Helmet-Mounted Display." Defense Technical Information Center Document, 1981. http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA109431Buswell, Guy T. *How People Look at Pictures: A Study of the Psychology of Perception in Art*. Chicago: University of Chicago Press, 1935. http://psych.wfu.edu/art_schirillo/articles/Buswell,%201935.pdf

Droessler, Justin G., and Donald J. Rotier. "Tilted Cat Helmet-Mounted Display." *Optical Engineering* 29, no. 8 (1990): 849–854.

Duchowski, Andrew T. *Eye Tracking Methodology: Theory and Practice*. London: Springer, 2007.

Edwards, Emily. K., Jannick P. Rolland, and Kurtis P. Keller. "Video See-through Design for Merging of Real and Virtual Environments." In *IEEE Virtual Reality Annual International Symposium, Septemer 18–22, 1993 Seattle, Washington/93Ch3336-5,* 223–33. Seattle: IEEE, 1993.doi:10.1109/VRAIS. 1993. 380774.

Fitts, Paul M., Richard E. Jones, and John L. Milton. "Eye Fixations of Aircraft Pilots. III. Frequency, Duration, and Sequence Fixations When Flying Air Force Ground-Controlled Approach System (GCA)". Defense Technical Information Center Document, 1949. http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA329371

Gemmell, Jim, Gordon Bell, Roger Lueder, Steven Drucker, and Curtis Wong. "MyLifeBits: Fulfilling the Memex Vision." In

Proceedings of the tenth ACM international Conference on Multimedia, 235–38. New York: ACM, 2002. doi:10.1145/641007.641053.

Goffman, Erving. *The Presentation of Self in Everyday Life*. New York: Doubleday Anchor Books, 1959.

Handa, S., and Y. Ebisawa. "Development of Head-Mounted Display with Eye-Gaze Detection Function for the Severely Disabled." In *2008 IEEE Conference on Virtual Environments, Human-Computer Interfaces and Measurement Systems,* 140–44. IEEE, 2008. doi:10.1109/VECIMS.2008.4592769.

Hansen, Dan W., and Arthur E.C. Pece. "Eye Tracking in the Wild." *Computer Vision and Image Understanding* 98, no. 1 (2005): 155–181.

Hansen, Dan W., and Qiang Ji. "In the Eye of the Beholder: A Survey of Models for Eyes and Gaze." *IEEE Transactions on Pattern Analysis and Machine Intelligence* 32, no. 3 (2010): 478–500. doi:10.1109/TPAMI.2009.30.

Hansen, John P., Dan W. Hansen, Anders S. Johansen, and John Elvesjö. "Mainstreaming Gaze Interaction Towards a Mass Market for the Benefit of All." *Human Computer International 2005*. London: Springer

Heilig, Morton L. Stereoscopic-television apparatus for individual use. US Patent 2,955,156, filed May 24, 1957, issued October 4, 1960.

Howeth, Linwood S. *History of Communications-Electronics in the United States Navy*. Washington: US Government Printing Office, 1963.

Huey, Edmund B. *The Psychology and Pedagogy of Reading: With a Review of the History of Reading and Writing and of Methods, Texts, and Hygiene in Reading*. Cambridge, MA: MIT Press, 2009.

Hutchinson, T. E., K. P. White, Jr., W. N. Martin, K. C. Reichert, and L. A. Frey. "Human-computer interaction using eye-gaze input." *IEEE Transactions on Systems, Man and Cybernetics* 19, no. 6 (1989): 1527–34.

Ishiguro, Yoshirto, Adiyan Mujibiya, Takashi Miyaki, and Jun Rekimoto. "Aided Eyes: Eye Activity Sensing for Daily Life." In *Proceedings of the 1st Augmented Human International Conference*. New York: ACM, 2010. doi:10.1145/1785455.1785480.

Jacob, Robert J.K. "Eye tracking in advanced interface design." In *Virtual Environments and Advanced Interface Design*, edited by

Woodrow Barfield and Thomas A. Furness, 258–88. New York, NY: Oxford University Press, 1995.

———, and Keith S. Karn. "Eye Tracking in Human-Computer Interaction and Usability Research: Ready to Deliver the Promises." *Mind* 2, no. 3 (2003): 573–604.

Johnson, Mark H., Suzanne Dziurawiec, Hadyn Ellis, and John Morton. "Newborns' Preferential Tracking of Face-Like Stimuli and its Subsequent Decline." *Cognition* 40, no. 1 (1991): 1–19.

Judd, Charles H., Cloyd N. McAllister, N. Cloyd, and W. M. Steele. "General Introduction to a Series of Studies of Eye Movements by Means of Kinetoscopic Photographs." *Psychological Monographs*. 1905. http://www.citeulike.org/group/2640/article/420454.

Just, Marcel Adam, and Patricia A. Carpenter. "A Theory of Reading: From Eye Fixations to Comprehension." *Psychological Review* 87, no. 4 (1980): 329–54.

Kahlert, Helmut, Richard Mühe, and Gisbert L. Brunner. *Wristwatches: History of a Century's Development*. West Chester, PA: Schiffer, 1986.

Katz, James. "Mobile Gazing Two-Ways: Visual Layering as an Emerging Mobile Communication Service." *Mobile Media & Communication* 1, no. 1 (2013): 129–33.

Kiyokawa, Kiyoshi. "An Introduction to Head Mounted Displays for Augmented Reality." In *Emerging Technologies of Augmented Reality Interfaces and Design*, edited by Michael Haller, Mark Billinghurst, and Bruce H. Thomas, 43–63. London: Idea Group Publishing, 2007. doi:10.4018/978-1-59904-945-8.ch022.

Kriss, Timothy C., and Vesna M. Kriss. "History of the Operating Microscope: From Magnifying Glass to Microneurosurgery." *Neurosurgery* 42, no. 4 (1998): 899–907.

Kurauchi, Andrew T., Carlos H. Morimoto, Diako Mardanbegi, and Dan Witzner Hansen. "Towards Wearable Gaze Supported Augmented Cognition." Paper presented at the CHI 2013 Workshop on "Gaze-Interaction in the Post-WIMP World," Paris, France, April 2013. http://gaze-interaction.net/wp-system/wp-content/uploads/2013/04/KMM+13.pdf

Landes, David S. *Revolution in time: Clocks and the Making of the Modern World.* Cambridge: Belknap, 1983.

Ling, Rich. " 'One Can Talk about Common Manners!': The Use of Mobile Telephones in Inappropriate Situations." In *Themes in mobile telephony Final Report of the COST 248 Home and Work group*, edited by L. Haddon, Stockholm: Telia, 1997.

———. *Taken for Grantedness: The Embedding of Mobile Communication into Society*. Cambridge, MA: MIT Press, 2012.

———, and Geoff Canright. "Perceived Critical Adoption Transitions and Technologies of Social Mediation." Paper presented at the Cell and Self Conference, Ann Arbor, MI, 2013.

Majaranta, Päivi. "Text Entry by Eye Gaze." PhD diss., University of Tampere, Finland, 2009.

Mann, Steve. "Wearable computing: A First Step Toward Personal Imaging." In M. Soegaard & R. F. Dam (Eds.), *Encyclopedia of Human-Computer Interaction*. 2nd ed, 25–32. Aarhus, Denmark: The Interaction Design Foundation, 2013. doi:10.1109/2.566147.

Mann, Steve, James Fung, Chris Aimone, Anurag Sehgal, and Daniel Chen. "Designing EyeTap Digital Eyeglasses for Continuous Lifelong Capture and Sharing of Personal Experiences." Paper presented at the Conference on Human Factors in Computing Systems, Portland, OR, April 2005. http://americasbesteyeglasses.org/goto/http://eyetap.org/papers/docs/Eyetap.pdf.

Mardanbegi, Diako, Dan Witzner Hansen, and Thomas Pederson. "Eye-Based Head Gestures." In *Proceedings of the Symposium on Eye Tracking Research and Applications*, 139–46. New York: ACM, 2012. doi:10.1145/2168556.2168578.

———, and Dan Witzner Hansen. "Mobile gaze-based screen interaction in 3D environments." In *Proceedings of the 1st Conference on Novel Gaze-Controlled Applications*. New York: ACM, 2011. doi:10.1145/1983302.1983304

McAtamney, Gerard and Caroline Parker. "An Examination of the Effects of a Wearable Display on Informal Face-to-Face Communication." In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 45–54. New York: ACM, 2006. doi:10.1145/1124772.1124780.

McCollum, Thelma. Stereoscopic television apparatus. US Patent 2,388,170, filed April 15, 1943, and issued October 1945.

Park, Hyung Min, Seok Han Lee, and Jong Soo Choi. "Wearable Augmented Reality System Using Gaze Interaction." In *Proceedings of the 7th IEEE/ACM international Symposium on Mixed and*

Augmented Reality, 175–76. Washington, DC: IEEE Computer Society, 2008. doi:10.1109/ISMAR.2008.4637353.

Rayner, Keith. "Eye Movements in Reading and Information Processing: 20 Years of Research." *Psychological Bulletin* 124, no. 3 (1998): 372.

Rolland, Jannick P., Christiana A. Burbeck, William Gibson, and Dan Ariely. "Towards Quantifying Depth and Size Perception in 3D Virtual Environments." *Presence: Teleoperators and Virtual Environments*, 4, no. 1 (1995): 24–48.

Singh, Hardeep, J. S. Bhatia, and Jasbir Kaur. "Eye Tracking Based Driver Fatigue Monitoring and Warning System." In *2010 India International Conference on Power Electronics (IICPE)*, 1–6. New Delhi, India: 2001. http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5728062.

Toyama, Takumi, Thomas Kieninger, Faisal Shafait, and Andreas Dengel. "Gaze Guided Object Recognition Using a Head-Mounted Eye Tracker." In *Proceedings of the Symposium on Eye Tracking Research and Applications*, 91–8.New York: ACM, 2012. doi:10.1145/2168556.2168570.

Wade, Nicholas J., and Benjamin W. Tatler. *The Moving Tablet of the Eye: The Origins of Modern Eye Movement Research*. New York, NY: Oxford University Press, 2005. http://books.google.com/books?hl=en&lr=&id=hJg2xhz7XKUC&oi=fnd&pg=PR7&dq=wade+and+tatler+2005&ots=FrHfsV0T30&sig=ZLFlwzQuzkkT788vu03Wkc2TSmY

Wandell, Brian A. *Foundations of Vision* Vol. 93. Sunderland, MA: Sinauer Associates, 1995. http://www.getcited.org/pub/103207005

Warren, Samuel D. and Louis D. Brandeis. "The Right to Privacy." *Harvard Law Review* 4, no. 5 (December 1890): 193–220. doi:10.2307/1321160.

Yarbus, Alfred L., and L. A. Riggs. *Eye Movements and Vision* Vol. 2. New York: Plenum Press, 1967.

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8

Beyond the Phone Number: Challenges of Representing Informal Microenterprise on the Internet

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How Will the Internet "See" Microentrepreneurs, and Vice Versa?

Throughout the developing world, details about even the tiniest businesses are beginning to be captured, processed, stored, and disseminated by the servers and services comprising the global Internet. Startups and multinational technology firms are adding records about small enterprises (with and without the knowledge of the enterprise operators) to populate "nearby me" map queries, search engine results, and mobile and social applications. Meanwhile, individuals pursuing "microenterprise" or "self-

employed" livelihood strategies frequently put business-related content on social networks like Facebook and LinkedIn (Wyche, Forte, and Schoenebeck 2013). How (and how successfully) will services on the Internet represent these businesses, when the lines between a small enterprise—an institution or service—and the entrepreneur—a person—supporting it are so blurred?

In this chapter, we offer some design insights from Kuza.com, a specialty microenterprise referral portal operating in South Africa and Kenya. One of the authors is a cofounder of Kuza.com, and this chapter offers a broad reflection on his experiences as a technologist. The urban areas of Kenya and South Africa were, at the time of writing, hosts to a myriad of incubators and innovation hubs, pilots, experiments, startups, and new digital services targeting resource-constrained users such as microentrepreneurs. The particular nexus of technology, geography, approach, and target population described in this case is therefore more useful as an early indication of future patterns and challenges than as a depiction of most microenterprises' current use of digital technologies or the Internet. While the themes we discuss are relevant to Kuza.com's specific experience as a startup, the motivation for the analysis is to provide a vehicle for broader practical and theoretical reflections upon the challenges of representation and standardization which will likely confront startups, large technology firms, and civil society actors alike—all of which have a stake in crafting and facilitating digital representations of resource-constrained microenterprises more broadly throughout the developing world.

Our focus in this chapter is on the subtleties and tensions inherent in the creation and dissemination of these formal digital representations of largely informal physical enterprises. Digital profiles, whether on homepages, business directories, marketplace sites, or map results are increasingly able to convey information about an enterprise beyond its mobile phone number and/or physical address. Our reflections, organized as five "design themes," illustrate how these identities are negotiated: how challenging it can be for a person with little Internet experience to effectively participate in the crafting of that digital profile, and conversely the difficulty for a service in representing that enterprise, which is small, fluid, and informal.

The theoretical discussion builds on the results in three ways. First, we discuss one tension between early product launches and inclusive design. Second, we argue that the current challenges observed in the case of Kuza.com are indicative of broader and more persistent schisms between the *roles* of enterprises and individuals in marketspaces; between the formality of taxable, legible, regulatable businesses and the informality of ad-hoc or temporary forms of labor; and between global templates of digital representation and local, context-specific constructions of livelihoods. Portrayals of microentrepreneurs by Internet services are fluid, personal, and blurry because microenterprises are fluid, personal, and blurry. Second, we argue that the design themes uncovered in the Kuza.com case may portend more complex challenges ahead, as mobile, and social information about entrepreneurs, enterprises, and places migrates beyond the handset or PC into more pervasive forms and contexts.

To be clear, this paper does not offer a full evaluation of Kuza.com's success as an enterprise, nor of its general technical approach as a mechanism for reducing poverty or promoting enterprise development (Duncombe and Heeks 2002). Rather, it is a more focused reflection on the challenge of representation of microenterprises by Internet services, and is intended as an input to, rather than a replacement for, these broader analytic exercises.

Context and Related Work

Microenterprises

Microenterprises—predominantly sole proprietors and small firms with five or fewer employees—are central to the livelihood strategies of many households in the developing world (Mead and Leidholm 1998). Microenterprises are active in almost every sector of the economy, from services like transport and beauty care to small manufacturing and retail. Depending on one's definition, many smallholder farmers and fishermen can also be considered microentrepreneurs.

The array of experiences of microentrepreneurs is as diverse as the larger economy itself; however, regardless of the specific sector, microenterprises in developing economies share some structural

characteristics that researchers and policymakers have used to distinguish them from larger firms. Many microenterprises are temporary; individuals can start and stop microentrepreneurial activities as circumstances require, and/or as better opportunities (e.g., wage jobs) become available (Daniels 1999). Most are informal, staying invisible to tax collectors and regulators, and often lacking the protection of laws to support formal enterprise. Many others, without deeds or title to their place of business, working from home (Prugl and Tinker 1997) or on the street, exist in a complex relationship with space. Often, the debts, earnings, and assets of an individual, a household, a family, and a business will be intermingled (Rutherford 2001). For all of these reasons, and regardless of technological representation, the lines between a microentrepreneur and a microenterprise are rarely clear (Donner 2009).

Many within the community of scholars and practitioners of Information and Communication Technologies for Development (ICT4D) are interested in the ways in which ICTs may help microentrepreneurs advance their livelihood goals (Donner and Escobari 2010). For example, a recent issue of the interdisciplinary journal *Innovations: Technology, Governance, Globalization* was devoted entirely to the potential of mobile telephony to help microenterprises (Quadir 2012).

One thread, explored in *Innovations* and beyond, examines how microentrepreneurs appropriate and use existing technologies (such as PCs or mobile phones) without any outside intervention. By facilitating simple person-to-personal contact, the telephone (originally fixed, but now overwhelmingly mobile) is the information technology most useful to microenterprises in the developing world (Duncombe and Heeks 2002). A recent review suggests that there is evidence that microentrepreneurs in a variety of industries and locations use mobiles effectively for managing relationships with existing customers (Donner and Escobari 2010). However, evidence quantifying the magnitude or generalizability of the impact of mobile phone use on microenterprises remains relatively scarce (Chew, Levy, and Ilavarasan 2011). While mobile use is common, use of the Internet, beyond the phone, remains the exception rather than the norm for many low-resource microenterprises.

Another thread focuses on the design and deployment of interventions and technologies specifically designed to help microenterprises. These can take the form of basic SMS services, to provide tailored two-way interactive information exchange. In addition, with the increasing availability of data-enabled feature phones and smartphones, a wider range of accessible, affordable data manipulation can be accomplished via the handset (Donner 2009). Offerings like Esoko in Ghana make market information available to farmers via handsets (Davies 2012), and purpose-built services for microenterprises are some of the hundreds of mobile applications for development now in circulation (Williamson and Gardner 2012).

Microenterprises and Marketing

One of the most universal challenges facing microentrepreneurs is finding customers—by advertising wares, making pitches, becoming visible. A variety of marketing strategies predate phones and mediated communication, such as cultivating networks of intermediaries (middlemen), locating bazaars or markets or districts in spatially known areas where firms might cluster (Geertz 1978), displaying signage and visible significations (e.g., a flower salesperson carries marigolds in her hands), and relying on the repeat business of a few customers. These all, of course, continue but are increasingly augmented by *mediated* forms of marketing and search. As we mentioned above, microentrepreneurs can and do appropriate existing technologies (like the mobile phone, a phonebook, or a Web page) and can also benefit from specific services purpose-built to market microenterprises, when those are available.

The resulting market landscape in many places is becoming a mélange of the old and new approaches: the offline and the online, the appropriated and the purpose-built. The mix varies from region to region and from industry to industry, and the majority of microenterprises in developing countries are still probably not participating online in any way. But as the Internet keeps pushing into new communities, driven by pervasive coverage and cheap data-enabled handsets, more microenterprises' marketing strategies will become part of the din of digitized commercial life, and more

microentrepreneurs will be able to mix offline reputation with new forms of mediated discovery, remaining in spatial markets yet also venturing into digital records and media.

This increasingly rich (though by no means complete) digital representation of microenterprises is being supported by a variety of institutions. On the one hand, popular services of the global, digital Internet are gathering data about small enterprises. Google, Microsoft, and Nokia provide maps of the world's physical, social, political, and commercial terrains; eBay, South Africa's Gumtree, Kenya's OLX, and other marketplaces allow individuals' enterprises to advertise goods and services; Foursquare, Facebook, and their ilk host profiles and allow users to check in and rate small enterprises; search engines crawl the Web to find new mentions of products or services for sale locally and worldwide; labor listings match job seekers to part-time job opportunities; and formats for user-generated content encourage people to post a story, photo, video, or blurb about the last cup of tea they purchased—whether it was from franchise #13,451 of a global restaurant chain or from an informal tea vendor on a street corner. (Burrp.com, a Yelp-like restaurant review site in India, has a category of ratings for Road Side Stalls; a Bloomberg News article reported on October 17, 2013, that Dianping.com, Burrp's analogue in China, boasts seventy-five million monthly users.) In each case, the databases of enterprises, labor, goods, and services available become valuable and useful as they become more comprehensive—as they begin to approximate the "yellow pages" of a telephone directory (Himmelstein 2005).

Government and not-for-profit sites want small enterprises business to be online as well. For example, wozoaonline.co.za is a partnership between the Government of South Africa, Google, and the mobile operator Vodacom, promoting websites for SMEs. In Kenya, the same website functionality (sans a prominently displayed government partner), is offered by Google as kbo.co.ke.

There is also a more distributed, bottom-up approach to marketing. Some small enterprises may even have a presence on LinkedIn or on *personal* pages on Facebook (as distinct from dedicated "business" pages which Facebook also supports (Sterling 2013). Wyche, Forte, and Schoenebeck (2013) illustrate how some microentrepreneurs and sole proprietors in Kenya use personal pagers Facebook pages to search for jobs (through networking), to

coordinate remittances from facility abroad, or, most germane to this conversation, to market their small business or entrepreneurial activity. Similarly, Pritchard and Vines (2013) describe how resource-constrained musicians in Cape Town use Facebook and MySpace to promote their shows—a livelihood strategy executed via social media.

Finally, specific platforms for marketing and market-making for small enterprises and livelihoods in the developing world include Cell Bazaar in Bangladesh (Wilson 2009; Zainudeen and Samarajiva 2011) as well as Dial-a-taxi (Kumar et al. 2008), NowFloats, and Babajob in India. These ventures have identified a gap where the global templates of LinkedIn, Facebook, or Google search may not be up to the task, and have stepped in to try to link informal providers with would-be customers, either for local search and local provision of services, or in some cases to link producers in the developing world to customers overseas.

The crux of our discussion is that *the task of matching digital representation of an enterprise to the enterprise itself is particularly difficult in the context of informality*; given microenterprises' uneasy relationships to place, to temporal permanence, and to households and individuals, the tools (and solutions) brought to bear by even a purpose-built solution like Kuza.com (let alone a more general platform like Facebook or LinkedIn) may not match the needs or realities on the ground.

Method

To reiterate, we did not re-interview Kuza.com users (neither microentrepreneurs nor customers) specifically for this chapter. This chapter is, instead, the result of a reflective exercise (Schön 1983). Jonathan is a researcher with previous experience studying microenterprises' use of ICTs; Andrew is a designer, researcher and—most importantly in this case—co-founder of Kuza.com. Andrew's first-person experiences with building Kuza.com comprise the data behind our chapter; the method is one of dialogue, synthesis, and commentary to revisit and re-examine some of the assumptions and decisions the Kuza.com team made during the design and deployment of the system: a process that included extensive conversations with prospective and actual Kuza.

com users.[1] The reexamination reported in this chapter took the form of a series of conversations between the authors, the threads and detours of which we agreed to capture in note form, then iteratively aggregated into the five design themes conveyed in the results section.

In terms of stance, then, this chapter is not a broad evaluation of Kuza.com; neither a celebratory business study of "What Works" (Phipps et al. 2003; Sharma and Yadav 2003) in ICT4D nor a post-hoc dissection of what didn't (in the form now popularized in the ICT4D community as "failfare") (Voytsehovska 2011; Dodson, Sterling, and Bennett 2012). Rather, we structured the conversations to surface design tensions and theoretical issues generalizable beyond the Kuza.com case, and of use to other ICT4D interventions and social enterprises. It is important to acknowledge how our stance and methods also interacted with our own experiences and structural position (as prosperous urban researchers and university-trained designers) to both enable and constrain what kinds of themes would be captured by this exercise. Indeed, Andrew is an entrepreneur himself: Kuza.com is a startup, not a research project nor a pro-bono project. But neither of us are "microentrepreneurs" in the socioeconomic way in which the term is used in the paper. Thus, while our conversation succeeded in its intended goal to gather design insights broadly related to the tensions around informality and formality, other important threads (perhaps particularly around gender and socioeconomic impact) were not pursued and are notably absent from the discussion below. Other methods and datasets would be required and should be deployed to broaden our understanding of these issues beyond what this chapter can provide.

Kuza.com Origin and Approach

At this stage, some background on the service is in order. Kuza.com stemmed from discussions between the two founders, Pieter Nel and Andrew Maunder, around marketplaces and location. The site was founded in May 2011 and launched the full product offering in December of that year. At the time that this chapter went to press in early 2014, Kuza was active, with more than 6,000 registered users.

Pieter and Andrew believed (and still do) that traditional marketplaces, particularly in developing regions, are inefficient at exposing market opportunities. Participants (microentrepreneurs and their customers) often have to be physically present to gather relevant market information, and/or have to rely on a middleman to relay market information to them. Both constraints can result in information asymmetries and, potentially, market exploitation by privileged parties who possess market information. Pieter and Andrew also saw some weaknesses in the current digital marketplaces available to microentrepreneurs and their customers at the time, ranging from being inaccessible to some participants (e.g., the marketplace may not support a user's technology, or usability-related issues may prevent access) to out-of-date or "stagnant" market information.

To address these issues, the founders initially envisioned a digital marketplace comprised of several "Twitter-style" advert feeds framed by a physical location. For example, if an information seeker searched on Kuza.com for a plumber near Cape Town, they would be shown a Kuza feed containing a list of micro-adverts matching the search query. The founders believed that, like a Twitter feed, the Kuza advert feeds would have a "pulse" and a lively feed could, in theory, be able to capture the energy of a real-world marketplace. Stale adverts would sink to the bottom of the feed and, at some point, expire and be removed from the feed.

After experimenting with the microfeed concept, the Kuza team realized that the micro-adverts did not convey enough information about the microentrepreneur. Therefore, they decided to use the micro-adverts as hooks back to the associated Kuza profile page where a microentrepreneur could describe his or her business endeavor and include some essential information. A typical profile would include an image, the name of the business, the user's name, contact information, a descriptive summary of the business, its physical location (with a street address or, more generally, the city, town, or neighborhood in which it operates) and finally, an optional, detailed description of the business. Adding more photos of products or completed work and gathering recommendations from happy customers can bolster a basic profile.

To tackle the issues of accessibility and inclusion, the founders kept two kinds of site users in mind as archetypes: Kuza.com

advertisers were assumed to be of relatively low socioeconomic standing as small or microenterprise owners, who would need to be able to access the Kuza.com database via their relatively basic mobile phones. Kuza.com *browsers*, on the other hand, were presumed to be of relatively higher socioeconomic status—consumers with money to spend and with needs for products and services to be fulfilled; browsers were expected to be more likely to access the database via a PC and the Kuza.com website. In the contexts of Cape Town, Johannesburg, and Nairobi (where rich and poor were spatially proximate) this dual-target, dual-market design was a promising part of the essence of the endeavor. This approach had a fundamental impact on several aspects of the software process, including architecture, protocols, and usability.

Design Themes

In this section, we detail five overarching themes that emerged in the series of conversations between Andrew and Jonathan in March and April 2013. The first two issues we will discuss highlight some of the particular challenges of designing powerful, useful, and intelligible experiences for populations with relatively little exposure to computers. The remaining themes extend outward from the interface (Burrell 2012),[2] and encompass matters of social context.

Theme 1: Minimizing the Mystery of the Database

When we began to debrief and identify tension points in the Kuza.com experience, one of the first and most persistent issues was the matter of feedback. Our discussion echoed similar points observed by Masita-Mwangi et al. (2012)—building a first profile online, even with assistance, is a deceptively subtle and complex task.

Consider Kuza.com's tagline: "You can start promoting your business on the Internet in the next five minutes! It's free and all you need is your mobile phone." This statement is only correct in a narrow, technical sense. There is almost no chance that an advertiser could close the full loop and find value in the system in the first five minutes. Until a microentrepreneur gets a phone call

or message from a potential customer mentioning Kuza.com, they are in limbo.

This lack of feedback is not unique to a business listing site such as Kuza.com. We were reminded of two other profile hosting services that have built in feedback mechanisms; both LinkedIn and academia.edu tell users when their profiles have been found or viewed, but waiting for feedback may be more important when these are *first-time* experiences. Andrew recalls receiving a call from a user who complained that their profile had been live for more than 24 hours and "nothing had happened." In the absence of feedback, the exercise is one of writing a profile for what Marwick and Boyd (2010) call an "imagined audience."

Yet, to really succeed, microentrepreneurs must write not only for imagined people, they must write also for machines. A major piece of the puzzle is that Kuza.com was intended to make its user profiles discoverable via generic Google search; thus, Kuza.com's model depends on Google's algorithm and Web crawler. In the case above, the microentrepreneur had received no feedback or response because (1) crawling takes more than 24 hours, (2) even after being crawled, there is no guarantee that a profile will rank highly enough to be returned in a given search, and (3) even if it were returned and read by a potential customer, there is no guarantee that the searcher will decide to contact the microenterprise in the profile. This cascade of complexity is of course essential to the model of online advertising (Richardson, Dominowska, and Ragno 2007), but we should not take this piece of intermediation for granted. In Andrew's words, Kuza.com had to "teach its users to speak Google"; that language is opaque indeed (Graham and Zook 2013; Karjaluoto and Leinonen 2009; Sengul et al. 2000).

Indeed, Google is only one element of this complexity: Kuza.com drew on data, architectures, and identities from Facebook, Twitter, Google, and SMS-based bulk messaging shortcuts. Marrying the systems in a way that is intelligible to first-time users is both a design problem and structural one. In summary, the limbo problem illustrates and underscores how first-time Internet experiences on the mobile can lack feedback and signposting (Gitau, Marsden, and Donner 2010); helping new users build discoverable websites against a backdrop of mysterious algorithms is even harder.

Theme 2: Planning for a Mobile Centric Experience

To succeed in its mission of improving livelihood opportunities for resource-constrained small enterprises, Kuza.com had to create a system where "mobile centric" and "mobile-only" microentrepreneurs (Gitau, Marsden, and Donner 2010) were predominantly interacting with the system via portable devices, while potential customers would be finding them via search or via Kuza.com's website. That system came with two major design trade-offs.

First, Kuza.com made a difficult but important choice to support data-enabled feature phones in addition to more powerful smartphones. This reflected the distribution of devices in the target communities but came with considerable extra development headaches.

Second, the inclusion of feature phones demanded degradations in the mobile experience that Kuza.com was able to deliver. These trade-offs are faced by any mobile service that wants to be accessible beyond those with smartphones (Donner, Verclas, and Toyama 2008), but it is particularly interesting to note how building for feature phones sometimes creates a poor experience for precisely the population that might need the most handholding and that could benefit most from a more evocative and helpful user interface.

These issues forced the Kuza designers into a particularly challenging situation. At the most basic level, feature phones required them to consider screen sizes right down to the limitations of 128 x 160 pixels. Other attributes of basic-feature phones added to the development headaches. For example, cropping a photo on a phone with very little internal memory requires some server-side magic. The constrained solution space meant that the team had to focus mainly on the "utility" side of the product (i.e., profile creation and content production). Over time, the design team was able to improve the usability of the mobile interfaces to a point where the "utility" was made accessible to the target users and they were able to participate.

But this wasn't enough. The next and by far most complicated part lay with what the industry calls "content strategy." Put simply, the team had to wrestle with how to help the Kuza.com advertiser create a "good" profile, where "good" depended on the audience

viewing the profile. Recall that the user's audience may be viewing their profile on a desktop computer and comparing it to other websites on the Web. This brings us back to the issue of feedback, but this time in the context of device capability and screen size. Modern smartphone experiences often include user training techniques called "coach marks" or "graphical wizards" and animated videos to educate the users and attempt to close gaps in their mental model of the product. These can work well on the desktop environment or on higher-resolution mobile devices but tend to break down in small-screen environments—there simply isn't enough space. On top of all of this, micro entrepreneurs using feature phones may also be extremely price-sensitive and unwilling to download additional media associated with the coaching experience. This is in stark contrast to online services, such as Facebook or LinkedIn, which have traditionally used the mobile interface as a complement or extension to the desktop experience.

Adopting a "mobile first" approach extends far beyond simply using the limited capabilities of a basic feature phone to generate a set of design constraints: it requires an appreciation for the fact that, for many users, the mobile phone will be their first and only interface to Internet services. The designers of such services are not only tasked with the challenge of educating their users about the utility of the product but also the wider implications of using the service; this communication has to, in many situations, be conveyed through a 128 x 160 pixel display. That said, even if we manage to make content production tools (such as Kuza.com) accessible to microentrepreneurs, it is not clear how to convey the soft, difficult craft of content strategy to first-time Internet users.

Theme 3: Encoding Credibility, Not Just Information Exchange

In discussing the next theme, we begin to pivot to a broader lens about sociodigital systems. Another expectation in the design of Kuza.com was that it would not be sufficient to simply deliver to searchers a listing of microentrepreneurs offering a given service in a given geographic location; rather, the design would have to help convey credibility and trustworthiness to would-be customers (Metzger 2007). Decisions about how to structure the profile interacted with assumptions and operating models about what constituted credibility.

To address the credibility challenge, the designers of Kuza.com took inspiration and design cues from their interviews and ethnographies with potential users (Beyer and Holtzblatt 1998). In early interactions, microentrepreneurs came to the meetings with books of photos of their work or presented ad-hoc slide shows from their mobile phone's photo gallery; for example, a photographer would show printed photos of his work or a builder would show pictures of a swimming pool project he recently finished for a client. Kuza.com placed these at the center of the profiles in an effort to replicate the off-line experience of providing those photos of the work. In this way, Kuza.com allowed its enrollees to engage in electronic ascription—although most of the microenterprises were selling physical goods and services, via Kuza.com, they were asked and given the opportunity to manage digital information about their services. This separation of product from information about a product has been identified as a central feature of electronic commerce since the earliest days of the World Wide Web (Evans and Wurster 1999; Rayport and Sviokla 1994). It is remarkable, however, to reflect on how pervasive this separation has become. Nearly two decades after the original dot-com boom, microentrepreneurs are wrestling with similar dynamics of representation as marketplaces (like Kuza.com) proliferate.

The designers of Kuza.com were also respectful of subtle touches of social signals; Andrew reported that, in early interviews leading up to the site design, the importance of showing up in good shoes, or in a car, came up frequently. The Kuza.com interface was clean and modern, and in subtle ways reflected an aspirational middle class or professional presentation. For example, it allowed users to adopt a custom URL instead of a string of digits for a small fee. Note here the blurring between the presentation of the enterprise and the entrepreneur. Indeed, in one case, an entrepreneur elected to clip and upload a picture of a famous Kenyan preacher, dressed in a suit and tie, rather than his own image.

Finally, and perhaps most importantly, Kuza.com offered a recommendation system; microentrepreneurs were encouraged and given the affordances to gather online feedback and endorsements from previous, satisfied customers. Social signals, trust, and embeddedness have been part of markets for as long as there have been markets (Geertz 1985), and examples like Amazon,

eBay, Angie's List, and LinkedIn illustrate how the digital display of recommendations has been a common model for business directories and online markets (Resnick et al. 2000). In a further move that both reflected a general zeitgeist on the Internet and a specific choice to make its gathering easier, feedback on Kuza.com was designed to be mostly offered via Facebook and Twitter. The choice to enable Facebook as the vehicle for leaving comments was powerful, and perhaps had ramifications beyond simply recommendation. We will discuss the cross-pollination of Facebook and Kuza.com content below. For now, the point is that Facebook comments were intended to allow for up-status recommendations. An ideal case might have been a happy homeowner reporting on a successful retiling by a skilled contractor.

Yet in welcoming Facebook *comments*, Kuza.com was also propagating Facebook *context*. Names and photos carried signifiers of recommenders' gender, language, race, and socioeconomic status that would be visible to browsers. Also, the choice to allow comments may have placed those advertisers without recommendations at a disadvantage. We noticed some profiles in which users had tried to have their friends post feedback, or had even posted feedback of their own. In this case, even the iconography of how the recommendations were facilitated may have signaled class distinctions; recommenders using Facebook or Twitter (higher-status social network services) were accompanied by a photo or avatar, while recommendations coming from the short message service (often lower status) did not. Even the sign-on page inviting recommendations had this stratification; Facebook and Twitter had beautiful logos and elegant click-through procedures, while the short message service instructions were considerably more complex.

The Kuza.com team experimented with alternative layouts that might impact perceived credibility differently. One idea revolved around using the Kuza.com blog as a place to feature specific Kuza users. In one example, the team published a blog post which told the story of a young couple who had managed to renovate their home on a tight budget thanks to the help of two skilled tradesmen. The result was a glossy, magazine-style article in which the two tradesmen were recommended and links to their Kuza profiles were featured. Although the team did not test the impact on credibility

with users, the appearance seemed to portray the entrepreneurs in a different light, relative to the experience of viewing their profiles, or viewing them amongst an undifferentiated list of profiles shown on the Kuza.com homepage—the point being context matters and having an online profile allows services to "snap" that profile into different contexts; the challenge is to know what the most effective relative mix of profiles and contexts might be.

Theme 4: Entrepreneurs being Entrepreneurial

At this point, the first three observations might leave the reader concerned about microenterprises' opportunities on the system; feedback is hard, designing a mobile centric experience is difficult, and despite good efforts to allow microentrepreneurs to put their best offer forward, subtle class distinctions may have crept back into the encoding and representation on the system. But these three formulations by no means tell the full story: another thread that emerged in the conversation and debrief was around the broad, opportunistic, and savvy ways in which Kuza.com users integrated the system into their own broader livelihood strategy and branding.

Kuza.com is the only digital means in which people market their business. Rather, we observed how many Kuza.com users employ the system to point to websites they had created elsewhere, or their own Facebook page. Thus, while some users may have been completely new to digital representations of self or self-businesses, many others used Kuza.com as one link in a mélange of networks to create a multi-site, multidimensional representation of their enterprise.

In one particularly interesting example, we found a Kuza user involved in the construction trade who had listed all their skills in the full description section of their profile. The text read "building .plastering .roofing painting .plumbing .electrical," plus two other skills, of which several were repeated. The block of terms in this situation reminds us of Ilahaine's (2010) description of bricolage. The designers were intrigued by the phenomenon because it seemed as if the user knew "how to speak Google," and had loaded his profile with a variety of "key words" without any encouragement from the user interface. The strategy works quite well on the Kuza search engine, and the user in question appears on the first page of

results (in most cases) if one of the keywords is used in the search term. In some sense, the user has gamed the system and converged on a lay version of search engine optimization (SEO).

This aggregation behavior seems to mimic a real-world behavior identified in one of the scoping interviews Andrew had conducted with a part-time construction manager during the original site concept testing. At the time, that manager pointed out that if you asked a tradesman or artisan waiting at a local pick-up point if they were able to do *X* construction task, they would more than likely say yes. The challenge for the construction manager is to determine if the tradesman is any good at the task/skill in question. He pointed out that he had learned to address the quality issue by spending a few minutes phoning a reference for one tradesman (e.g., a carpenter) and, once satisfied, asking the carpenter to choose the other team members (e.g., plumber and painter). The rationale is that the team would only get paid if the entire job were completed to a satisfactory level of quality.

Similarly, although Kuza.com made design decisions that foregrounded marketing and new customer acquisition, Andrew observed cases where users created channels for ongoing (non-recommendation-based) communication. Specifically, there was evidence of the profile recommendations being used for the purposes of commenting and conversation: in one example, a prospective customer wrote, "Where is ur location" on the recommendation section of a paint wholesaler's profile. Clearly, the user had appropriated the recommendation text field to ask a question and not to post a recommendation.

Theme 5: Microentrepreneurs are Not Microenterprises

Finally, our discussions revealed a few interconnected ways in which Kuza.com sometimes foregrounded presentation of people (microentrepreneurs) rather than microenterprises. In some cases, there was a blurring between the personal and the productive spheres (Molony 2009; Donner 2009).

Some individuals simply posted personal content that would be better suited to a personal section on a classified platform or dating service and seemed out of place amongst the general set of Kuza profiles.

A second, subtler, blurring was also evident between representations of an actual business and those of an aspirational business: a promise that one could do some work but with no indication that work had ever been done. The line between a list of goods for sale and "jobs wanted" was not always clear.

In our conversations, we noticed how a third blurring was directly encoded into the site: Kuza.com offered a space for "your picture," not "a picture of the product or the venue." Was Kuza.com addressing microenterprises as institutions, or microentrepreneurs as people? In a way, this is perhaps the most interesting of the three, since the blurring is bidirectional, and not entirely attributable to appropriation or hacking by Kuza.com users. In some cases, the microenterprise was just big enough to possibly require a split in profiles and voices; whereas the owner might be the one to make decisions and set direction, his/her shop assistant might be best positioned to capture stock, etc. In light of such complexities, whose details and pictures belong on the Kuza.com website?

In summary, there are many instances in which a digital representation of a microenterprise would sit between what, in 20th century telephone parlance, would be considered the domain of "White Pages" (listings of individuals) and "Yellow Pages" (listings of businesses). The global Internet logic may default to updated white/yellow dichotomies of those enterprises (e.g., LinkedIn is for jobseekers, Google Maps is for enterprises, while Facebook has distinct page categories for people and businesses), but the entrepreneurs (and the enterprises) are not all playing along. Personal content finds its way into professional listings, and personal social network sites are repurposed for professional goals.

Discussion

We presented the results of our discussions as five design themes: these included two "user experience" ones—namely, the difficulties of manipulating and creating profiles for imagined customers and mysterious algorithms, and the challenges of doing so through a constrained mobile interface—and three broader tensions that manifested at the level of the sociotechnical system—namely, the subtle cues about encoding and conveying credibility when matching unfamiliar buyers and sellers across class and spatial

lines, the appropriation of the platform to fit with other livelihood strategies, and the difficulties in portrayal of enterprises versus people.

None of these five general tensions were sufficient to derail Kuza.com's endeavors; it is still operational and many other similar services are being offered around the world. Our reflective exercise was not calibrated to address all the questions that might arise from a focus on Kuza.com. In particular, we acknowledge that our discussion offers an evaluation neither of whether Kuza.com in particular has been successful as a startup with a social mission nor whether, more broadly, ICTs like the mobile Internet contribute to socioeconomic development by helping microenterprises and microentrepreneurs be more productive (Chew, Levy, and Ilavarasan 2011; Donner and Escobari 2010). In the absence of a detailed evaluation, all we can say on impacts is that Kuza.com and its peer sites around the world have been able to put details about small enterprises online, in ways that make some small enterprises more visible to more potential customers than had been possible in a pre-digital era. Instead, the discussion, like the design themes presented above, will focus more specifically on the challenges associated with the digital representation of informal physical enterprises, by services which more often than not have been developed with 'formal' institutions and/or prosperous individuals in mind.

Segments, Early Adopters, and Inclusive Design

Like any startup, Kuza.com had to gain a thorough understanding of its target customers. There was an acknowledged tension between the founders' desire to serve resource-constrained small enterprises and the normal market dynamics for new products and services. Andrew suggests that the founders were guided by Moore's popular business text *Crossing the Chasm* (2002), while Jonathan was reminded of Rogers' decades of research on the *Diffusion of Innovations* (1962). Both threads recommend viewing the market for technical innovations as consisting of early, mainstream, and late segments with very different demands and habits, and indeed, that division seemed to play out. A perusal of the Kuza.com site would reveal a mix of strivers and accomplished businesses, but (importantly) also a relative preponderance of small technology

shops and relatively savvy, digitally literate entrepreneurs ranging from computer ships to recording artists.

These innovators and early adopters were already part of an existing Internet ecology and, consequently, they understood the potential benefit of creating a Kuza.com profile and were willing try it out with little persuasion from the Kuza.com street team. ICT4D frameworks (and rhetoric), however, may encourage technologists to focus their efforts on users who are more at risk from a livelihoods perspective. The potential mismatch in expectations and tailored services is clear: it is possible that the people who would benefit the most from a new technology will only experience it at a later stage. This case suggests that the ICT4D contribution of a new service developed with market paradigms may initially be occluded, and the solution's value may only be realized much later.

Digital Encoding of the Microentrepreneur Role

Another implication suggests that we consider the design tensions as evidence of the contestability and complexity of the role of the microentrepreneur in general. Our themes have led us to question the coherence, in a sociological sense, of microentrepreneurs and, further, to specifically reconsider how effectively digital services like Kuza.com can enable individuals to perform or even transcend that role. Solomon et al. (1985) illustrate the utility of a role theory perspective (Coser 1975; Lopata 1995) for business transactions, highlighting how interactions between service providers and customers can be viewed as performances, with generalizable/abstractable scripts, norms, and expectations that transcend specific interactions. In daily life, the individuals advertising their services on Kuza.com earn their livelihoods as gardeners, jewelry makers, transport agents, and so on, and there is little doubt that those are stable role categories; however, when aggregated and abstracted on a site like Kuza.com, the stability of the role of microentrepreneur becomes less clear. From a distance, enterprises operating in the informal economy have an identifiable set of characteristics (e.g., size, skills, stability) as well as a generalizable structural location. However, the generalization and aggregation of disparate livelihoods into a single broad category could be linked to a rhetorical agenda that has been a part of the economic development discourse for

a long time. Mohammed Yunus and the Grameen Bank helped launch a movement around the use of small loans to help poor people pursue livelihood strategies partly by branding them as *entrepreneurs* (Yunus 1999). Today, development agencies, NGOs, and hybrid technology social enterprises like Kiva.com celebrate the faces and individuals behind the enterprises as much as they do the enterprises themselves. Within the ICT4D paradigm, the motivation to help microentrepreneurs is both understandable and laudable, but as our initial discussion of informality and transience makes clear, the entrepreneur and the enterprise are not the same—they are blurred, in ways that sometimes promote livelihood strategies and sometimes hurt them.

We suspect that one strain when moving to a digital encoding of the role of microentrepreneur is that the size and possible informality of the enterprise (i.e., the things that tend to define microentrepreneur as a category to and for development professionals, researchers, and microfinance institutions) is not the defining characteristic motivating the search from the perspective of would-be customer. Few customers are seeking out microenterprises; they are seeking gardeners, jewelry makers, transport agents, and so on. The service or product, available in a certain location at a certain price and time, is much more valuable that the generalized role. Thus, perhaps a "headless" Kuza.com site, with information completely folded into the digital milieu of Google Search or Maps may make more sense. The roles as purveyors of specific products, services, etc., should be manifested front and center, rather than the role of microentrepreneur; in the case of the gardener, competition comes not only from other small enterprises offering gardening services but also from do-it-yourself gardening books or large national garden shops that might be able to do the same thing. Who is *not* the competitor for gardener, however, is the jewelry maker who also happens to be self-employed.

These subtleties of encoding carryover even into representation on standalone websites, or within other databases. Green et al. (2001) remind us that the commercial development of any mobile product requires acting on the best-effort understandings that companies have about their users, and that these understandings are quite different from those held by theoreticians or researchers. Yet the Kuza.com case illustrates how the customer profiles

and segmentations, which are the traffic of design firms and technology companies, might be understood as lay articulations of sociological roles. In the case of the Kuza.com website design, such understandings included an imagination of the role (actions, scripts, and expectations) that the microentrepreneur enacts when searching for customers, experiencing challenges around the display of goods, and particularly in building and maintaining credibility. In these same ways, the alternative sites posting "profiles" (e.g., LinkedIn or Facebook) also have encoded assumptions about roles into digital form. Postigo observed a similar dynamic unfolding around the design of a human rights portal.

> It should come as no surprise that designers, throughout the design process, imagine specific activities for users, they discuss them at length, and they try to anticipate what users might do, how they will relate to each other, and how they might push on the possibilities and affordances of the technical architecture. Designers, in other words, envision *roles*. These visions of roles are coded into the architecture of a given web portal or interface. Users, in turn develop positions within the sociotechnical architecture based on the design implemented through a portal. How users relate to each other, what the expectations are, what they communicate to each other, and how they communicated are to some degree the result of the roles afforded them by the social and technical architecture they inhabit. (Postigo 2011, 183)

The strains we saw the case of Kuza.com, involving the blurring between yellow pages and white pages, and between foregrounding attributes of an individual versus and an enterprise or product, could be reinterpreted as strains between the roles as imagined and encoded by software designers and the enactments and portrayals that individuals wanted to make as part of their livelihood strategies.

Class on the Internet is a complex topic, and probably has not been explored in sufficient detail in settings outside the prosperous global North. We are reminded of Boyd's (2011) detailing of the interplay between class and representation among American teenage users of Facebook and Myspace. There is some risk that the aggregation of relatively low-SES microenterprises, offered as a fairly undifferentiated list on Kuza.com's main homepage, may actually have any impact and an experience quite different than what Kuza.com was intending to do with Google Search

optimization. Andrew likened the list to "The Point," a place in Cape Town where contractors or homeowners could always drive to find a group of individuals—informal entrepreneurs—waiting for work (Valenzuela 2001).

This issue of role strain, therefore, extends far beyond the issue of Kuza.com, and could be understood in terms of how architected interactions—these assumptions about roles—are being populated at a global scale. A profile page, absent of content but highly evocative in assumed role and parameters for social interaction, may have been designed in Seattle or Silicon Valley but is being used to mediate a buyer/seller exchange in specific neighborhoods between specific individuals in Nairobi or Johannesburg. It *may* be doing so in a way that breaks down established place- and class-based boundaries in urban economies (Santos 1979), but the reanalysis from the perspective of role helps illustrate how that page—that software—may not completely mitigate tensions between formality and informality.

Informality on Formal Platforms?

In this final section, we hope to recast these tensions as persisting beyond the particular moment, circa 2014, when companies like Kuza.com are trying to represent microenterprises on the Internet. On the one hand, we discussed how the concept of a microenterprise is to some extent a constructed role, an artifact of the development industry and an analytical category that has so pervasively informed policy and practice that some individuals are able to self-identify as microentrepreneurs. And yet, the persistent roles of individual vocations and livelihoods probably remain relatively stable.

Markets have always balanced information asymmetries, context, and trust. Utilizing a sea of semi-disembodied information in the context of a market transaction may prove challenging enough when everyone has the same tools to do so at their disposal. One potential complication raised by the case of Kuza.com involves what these manipulations will look like when there are significant distinctions between the technologies, networks, skills, assumptions, resources, and literacies available to the actors in that transaction. The servers and services on the Internet ("the cloud") are generating data about individuals and enterprises, and are increasingly able to mediate or

moderate interactions happening between individuals in the real world; the case of Kuza.com illustrates both the potential and the pitfalls associated with making sure that those systems function well for everyone involved.

Against this background, the shift towards representing one's enterprise online can be seen as an extension of a process of digital mediation, which may have begun with the telephone, and the telephone number—essentially, a place-free electronic encoding of a means of interacting with an enterprise. Around Africa, one can find many examples of tiny businesses with a cell phone number hand-painted onto the doorway; undoubtedly, the cell phone provides reachability and serves as an electronic signifier of legitimacy for almost any business. Perhaps the presence of a website or other online record, no matter who put it there, could be added as another variable in an index of relative formality. It is possible that an "informal" enterprise with a website is considered to be less informal than the same enterprise without one.

Kuza.com (and Facebook and Google) illustrate how, at some point and in many cases, the mediation between buyers and sellers is shifting beyond reachability towards communication of value, structure, status, and other subtle social cues. If it is imperative to create, access, maintain, and propagate digital information about even tiny/informal nondigital microenterprises via the Internet, this is a noteworthy trend. Differences exist in hardware and software access, in enterprises' skills and competencies of presentation, as well as their resources and interconnected networks of social capital, and even in displays of customer sets. Thus, the stratified real may continue to find its way onto the Internet as millions of smaller microenterprises become represented on the Internet. Echoing Gillespie (2010), the digital platforms used to capture microenterprises carry a set of complex "political" parameters that both enable and shape how microentrepreneurs will be able to present their businesses to the world. Presentation of self is sometimes understood as identity work, and is done with an eye towards the renegotiation of role. Burt what about the presentation of enterprise? At this stage, we have not done a discourse analysis or a coding of the thousands of profiles on Kuza.com, as that lies beyond the scope of this article; however, such work may reveal narratives around the presentation of self, enterprise, and

enterprise-as-self. The unique experiences of microentrepreneurs is indicative of a future in which a growing proportion of humanity is responsible for representing some elements of their livelihoods in the digital space—we all need to speak to (and through) the machine.

As the technical landscape continues to evolve, the assumptions about roles that we encode into our devices and services will continue to structure the interactions that we have with each other. In the case of the constructed idea of a microenterprise, might it be worth raising some questions about what the next stage may look like? The promise of a smartphone with a heads-up display, or even an automobile that "knows" when its owner wants to engage in a particular transaction, is going to serve information about that transaction that will reflect the assumptions its designers have made about that transaction. What happens when (a) services intermingle to serve customers a "fuller" representation of a microenterprise's presence on the Web? or (b) when devices change and some have access to broad-spectrum information at the moment of a transaction while others do not? Our discussion about inclusive design suggests ways in which we might want to try to ensure that the pervasive digital devices and services that come next are accessible and usable by all parties, from prosperous customers to informal street vendors, and work as well in a market in rural Uganda as in a shopping mall in London. As presence and competence in the digital space becomes a prerequisite for an increasingly large proportion of transactions, even local ones, digital livelihood strategies will emerge as a more important factor in economic development.

Our exploration highlighted some current and persistent tensions involved in representing microentrepreneurs online. As a snapshot of the current state of digital affairs, the litany of tensions illustrates a challenge for digital inclusion: currently, many microentrepreneurs do not "get" the Internet, nor does the Internet always "get" them. There is no doubt also that the Web can be a powerful tool in matching labor to demand and products to would-be buyers. The rise of freelancing and fractional work, both in the developed and developing world, are illustrations of how this can work quite effectively. Nevertheless, challenges remain when individual microentrepreneurs, outside of collectives or without

middlemen, have to negotiate and maintain digital identities. There is still much work to be done to allow the Internet to best represent the mobile, informal, ephemeral, part-time, flexible, and multifaceted livelihood strategies that many people employ to survive.

At a second level, more from a theoretical perspective, this exercise has revealed some strains in the idea of a microenterprise itself. The term exists in the lexicon of research, and guides the provisioning of development interventions, but what about microenterprise as a role that is negotiated in everyday life between buyers and sellers? The tensions we highlight call into question whether identities constructed around microenterprise are as natural or as stable as those of discrete businesses and services. The aggregation of these levels suggests challenges ahead in terms of representing microentrepreneurial activities in highly stratified economic societies in the digital space. Capturing the full diversity of the world's economic activity in digital form remains a work in progress.

References

Beyer, Hugh, and Karen Holtzblatt. *Contextual Design: Defining Customer-Centered Systems.* San Francisco: Morgan Kaufmann, 1998.

Boyd, Danah. "White Flight in Networked Publics? How Race and Class Shaped American Teen Engagement with MySpace and Facebook." In *Digital Race Anthology*, edited Lisa Nakamura and Peter Chow-White, 1–44. New York: Routledge, 2011.

Burrell, Jenna. *Invisible Users: Youth in the Internet Cafes of Urban Ghana*. Cambridge, MA: MIT Press, 2012.

Chang, Heewon, Faith Ngunjiri, and Kathy-Ann C. Hernandez. *Collaborative Autoethnography*. Walnut Creek, CA: Left Coast Press, 2013.

Chew, Han Ei, Mark Levy, and Vigneswara Ilavarasan. "The Limited Impact of ICTs on Microenterprise Growth: A Study of Businesses Owned by Women in Urban India." *Information Technologies & International Development* 7, no. 4 (2011): 1–16.

Coser, Rose Laub. "The Complexity of Roles as a Seedbed of Individual Autonomy." In *The Idea of Social Structure: Papers in Honor of Robert K. Merton*, edited by Lewis A. Coser, 237–63. New York: Harcourt, Brace, Jovanovich, 1975.

Daniels, Lisa. "The Role of Small Enterprises in the Household and National Economy in Kenya: A Significant Contribution or a Last Resort?" *World Development* 27, no. 1 (1999): 55–65.

Davies, Mark. "Fertilizer by Phone: Esoko Enhances African Farmers' Livelihoods through Innovations in Data Access." *Innovations: Technology, Governance, Globalization* 7, no. 4 (2012): 27–41.

Dodson, Leslie L., S. Revi Sterling, and John K. Bennett. "Considering Failure: Eight Years of ITID Research." In *ICTD 2012: Proceedings of the Fifth International Conference on Information and Communication Technologies and Development*, edited by Michael L. Best, Ellen W. Zegura, Jonathan Donner, Beki Grinter, and Gary Marsden, 56–64. New York: ACM Press, 2012. doi:10.1145/2160673.2160681.

Donner, Jonathan, Katrin Verclas, and Kentaro Toyama. "Reflections on MobileActive08 and the M4D Landscape." In *Proceedings of the First International Conference on M4D*, edited John

Sören Pettersson, 73–83. Karlstad, Sweden: Karlstad University Studies, 2008.

———. "Blurring Livelihoods and Lives: The Social Uses of Mobile Phones and Socioeconomic Development." *Innovations: Technology, Governance, Globalization* 4, no. 1 (2009): 91–101.

———. "Mobile-Based Livelihood Services in Africa: Pilots and Early Deployments." In *Communication Technologies in Latin America and Africa: A Multidisciplinary Perspective*, edited by Mireia Fernández-Ardèvol and Adela Ros, 37–58. Barcelona: IN3, 2009.

———, and Marcela X. Escobari. "A Review of Evidence on Mobile Use by Micro and Small Enterprises in Developing Countries." *Journal of International Development* 22, no. 5 (2010): 641–658. doi:10.1002/jid.1717.

Duncombe, Richard A., and Richard Heeks. "Enterprise across the Digital Divide: Information Systems and Rural Microenterprise in Botswana." *Journal of International Development* 14, no. 1 (January 2002): 61–74. doi:10.1002/jid.869.

Ellis, Carolyn S., and Arthur Bochner. "Autoethnography, Personal Narrative, Reflexivity: Researcher as Subject." In *The Handbook of Qualitative Research*, edited by Norman Denzin and Yvonna Lincoln, 733–68. Newbury Park: Sage, 2000.

Evans, Philip, and Thomas S Wurster. *Blown to Bits*. Cambridge, MA: Harvard Business School Press, 1999.

Geertz, Clifford. "The Bazaar Economy: Information and Search in Peasant Marketing." *The American Economic Review* 68, no. 2 (1978): 28–32.

Gillespie, Tarleton. "The Politics of 'Platforms." *New Media & Society* 12, no. 3 (February 09, 2010): 347–64. doi:10.1177/1461444809342738.

Gitau, Shikoh, Gary Marsden, and Jonathan Donner. "After Access: Challenges Facing Mobile-Only Internet Users in the Developing World." In *CHI '10: Proceedings of the 28th International Conference on Human Factors in Computing Systems*, edited by Geraldine Fitzpatrick and Scott Hudson, 2603–6. New York: ACM, 2010. doi:10.1145/1753326.1753720.

Graham, Mark, and Matthew Zook. "Augmented Realities and Uneven Geographies: Exploring the Geolinguistic Contours of the Web." *Environment and Planning A* 45, no. 1 (2013): 77–99. doi:10.1068/a44674.

Granovetter, Mark. "Economic Action and Social Structure: The Problem of Embeddedness." *The American Journal of Sociology* 91, no. 3 (November 1985): 481-510.

Green, Nicola, et al. "Configuring the Mobile User: Sociological and Industry Views." *Personal and Ubiquitous Computing* 5, no. 2 (July 01, 2001): 146–156. doi:10.1007/s007790170017.

Himmelstein, Marty. "Local Search: The Internet *Is* the Yellow Pages," *Computer* 38, no. 2 (February 01, 2005): 26–34. doi:10.1109/MC.2005.65.

Ilahiane, Hsain. "Mobile Phone Use, Bricolage, and the Transformation of Social and Economic Ties of Micro-Entrepreneurs in Urban Morocco." *International Journal of Business Anthropology* 2, no. 1 (2010): 31–49.

Karjaluoto, Heikki, and Hannele Leinonen. "Advertisers' Perceptions of Search Engine Marketing." *International Journal of Internet Marketing and Advertising* 5, no. 1–2 (2009): 95–112. doi:10.1504/IJIMA.2009.021952.

Kumar, Arun, et al. "Organizing the Unorganized - Employing IT to Empower the Under-Privileged." In *WWW '08: Proceedings of the 17th International Conference on World Wide Web*, 935–44. New York: ACM Press, 2008. doi:10.1145/1367497.1367623.

Lopata, Helena Znanieka. "Role Theory." In *Social Roles & Social Institutions: Essays in Honor of Rose Laub Coser*, edited by Judith R. Blau and Norman Goodman, 1–12. New Brunswick, NJ: Transaction Publishers, 1995.

Marwick, Alice E., and Danah Boyd. "I Tweet Honestly, I Tweet Passionately: Twitter Users, Context Collapse, and the Imagined Audience." *New Media & Society* 13, no. 1 (July 07, 2010): 114–133. doi:10.1177/1461444810365313.

Masita-Mwangi, Mokeira, Nancy Mwakaba, and Jussi Impio. "Taking Micro-Enterprise Online." In *CHI EA '12: Proceedings of the 2012 ACM Annual Conference Extended Abstracts on Human Factors in Computing Systems Extended Abstracts*, 367. New York: ACM Press, 2012. doi:10.1145/2212776.2212815.

Mead, Donald C., and Carl Leidholm. "The Dynamics of Micro and Small Enterprises in Developing Countries." *World Development* 26, no. 1 (January 1998): 61–74. doi:10.1016/S0305-750X(97)10010-9.

Metzger, Miriam J. "Making Sense of Credibility on the Web: Models for Evaluating Online Information and Recommendations for Future Research." *Journal of the American Society for Information Science and Technology* 58, no. 13 (November 2007): 2078–91. doi:10.1002/asi.20672.

Molony, Thomas. "Carving a Niche: ICT, Social Capital, and Trust in the Shift from Personal to Impersonal Trading in Tanzania." *Information Technology for Development* 15, no. 4 (October 2009): 283–301. doi:10.1002/itdj.20127.

Moore, Geoffrey A. *Crossing the Chasm: Marketing and Selling Disruptive Products to Mainstream Customers.* New York: HarperBusiness Essentials, 2002.

Phipps, Keisha, et al. *What Works: HealthNet Uganda's Evolution from NGO to Sustainable Enterprise*. Digital Dividend "What Works" Case Study Series *What Works: The Work Program*. Washington, DC: World Resources Institute, August 2003.

Postigo, Hector. "Questioning the Web 2.0 Discourse: Social Roles, Production, Values, and the Case of the Human Rights Portal." *The Information Society* 27, no. 3 (May 2011): 181–193. doi:10.1080/01972243.2011.566759.

Pritchard, Gary W., and John Vines. "Digital Apartheid: An Ethnographic Account of Racialised HCI in Cape Town Hip-Hop." in *CHI '13: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2537–46. New York: ACM Press, 2013. doi:10.1145/2470654.2481350.

Prugl, Elisabeth, and Irene Tinker. "Microentrepreneurs and Homeworkers: Convergent Categories." *World Development* 25, no. 9 (1997): 1471–82.

Quadir, Iqbal. "Form, Transform, Platform: How the Ubiquity of Mobile Phones Is Unleashing an Entrepreneurial Revolution." *Innovations: Technology, Governance, Globalization* 7, no. 4 (2012): 3–12.

Rayport, Jeffrey F., and John J. Sviokla. "Managing in the Marketspace." *Harvard Business Review* (November 1994): 141–50.

Resnick, Paul, et al. "Reputation Systems." *Communications of the ACM* 43, no. 12 (December 01, 2000): 45–8. doi:10.1145/355112.355122.

Richardson, Matthew, Ewa Dominowska, and Robert Ragno. "Predicting Clicks: Estimating the Click-Through Rate for New

Ads." in *WWW '07: Proceedings of the 16th International Conference on World Wide Web*, 521–30. New York: ACM Press, 2007. doi:10.1145/ 1242572.1242643.

Rogers, Everett M. *Diffusion of Innovations*. New York: The Free Press, 1962.

Rutherford, Stuart. *The Poor and Their Money*. Oxford: Oxford University Press, 2001.

Santos, Milton. *The Shared Space: The Two Circuits of the Urban Economy in Underdeveloped Countries*. New York: Methuen, 1979.

Sengul, Aylin, et al. "From Search Engines' View Point: Web Pages Designed in Turkey." *Information Technology for Development* 9, no. 1 (2000): 13–23.

Schön, Donald A. *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books, 1983.

Sharma, Ajay, and Akhilesh Yadav. *What Works: Akashganga's IT Tools for the Indian Dairy Industry: Using IT to Increase Efficiency in Rural Dairy Cooperatives*. Vol. 8 of *What Works: The Work Program*. Washington, DC: World Resources Institute, 2003.

Solomon, Michael R., et al. "A Role Theory Perspective on Dyadic Interactions: The Service Encounter." *The Journal of Marketing* 49 (1985): 99–111.

Sterling, Michael. *Facebook: We Have 25 Million Active Small Business Pages.* Marketing Land (Blog), (18 November 2013). http://marketingland.com/facebook-we-have-25-million-active-small-business-pages-65629

Valenzuela, Abel. "Day Labourers as Entrepreneurs?" *Journal of Ethnic and Migration Studies* 27, no. 2 (April 2001): 335–52. doi:10.1080/13691830020041642.

Voytsehovska, Galina. "How to Discuss Failure—and Not Get Fired! Lessons from a 2011 Human Development Forum Session." *The World Bank* 10437 (2011).

Williamson, Chris, and Corina Gardner. "Thinking Horizontally and Vertically: A Better Way to Approach Mobile Innovation in the Developing World." *Innovations: Technology, Governance, Globalization* 7, no. 4 (2012): 69–86.

Wilson, Kim. "Can CellBazaar Survive without an Urban Market—and Fulfill Its Development Potential? (Innovations Case Discussion : CellBazaar)." *Innovations: Technology, Governance, Globalization* 4, no. 1 (January 2009): 71–3. doi:10.1162/ itgg.2009.4.1.71.

Wyche, Susan P., Andrea Forte, and Sarita Yardi Schoenebeck. "Hustling Online; Understanding Consolodated Facebook Use in an Informal Settlement in Nairobi." In *CHI '13: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2823. New York: ACM Press, 2013. doi:10.1145/2470654.2481391.

Yunus, Muhammad. "The Grameen Bank." *Scientific American Magazine* (November 1999): 114–9.

Zainudeen, Ayesha, and Rohan Samarajiva. "CellBazaar: Enabling M-Commerce in Bangladesh." *Information Technologies & International Development* 7, no. 3 (2011): 61–76.

Endnotes

[1] We are grateful to one of the anonymous reviewers of the paper for pointing out the overlaps between our approach and the practice of autoethnography. In particular, our sessions might be categorized as "autoethnograpic conversations" or "collaborative autoethnography." While these specialized methods and stances were not salient at the time we were generating the five design themes, we acknowledge that a more extensive application of these methods for capturing and incorporating reflexivity might have added additional layers and threads to our discussion. See Carolyn S. Ellis and Arthur Bochner, "Autoethnography, Personal Narrative, Reflexivity: Researcher as Subject," in *The Handbook of Qualitative Research*, ed. Norman Denzin and Yvonna Lincoln (Newbury Park: Sage, 2000), 733–768; Chang, Ngunjiri, and Hernandez, *Collaborative Autoethnography*.

[2] Burrell proposes and deploys a process of "spiraling outward" from an interface to a social context to great (and extended) effect in *Invisible Users: Youth in the Internet Cafes of Urban Ghana* (Cambridge, MA: MIT Press, 2012).

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9

Maps of Attractions and Conflicts: Some Implications of Socially Networked Spatial Annotation for Socio-Spatial Production Processes

by

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Keywords: maps, GIS, conflicts, tourism, civic engagement

Introduction

This chapter discusses some implications of the popularization of socially networked, software-based spatial annotation practices (e.g., Foursquare and similar applications) for processes of socio-spatial production. This work stems from a research project on the role of ICTs within the social production of urban space, carried out at the ARC Center of the Catholic University of Milan. The project relied on the notion of space as socially produced (Lefebvre 1991), and it generated a theoretical model of socio-spatial production (Tarantino and Tosoni 2013a; Tosoni and Tarantino 2013). The model attempts to account for the bidirectional translation (Callon

1986; Latour 1999) processes connecting *representations of space* (i.e., what is "said" or "thought" about a space), *spatial morphology* (i.e., the material aspect of space) and *spatial practices* (i.e., what is done, or can be done, by social actors in space), which together shape "social space." Simply put, this model argues that a "space" is produced by the interplay of what people think about it, what they do (and do not do) in it, and its physical configuration. These three poles continuously *translate* into each other, and thus social space is ever-changing. The model also argues that the translation processes within spatial production patterns can influence the social identities of the actors involved—the kind of space I produce contributes to defining "who I am" in the eyes of others and myself. We called this model RPM, which is short for Representation, Practices, Materiality (see Figure 1). In our applications of the model, we discussed the roles played by various ICTs, each with specific affordances and constraints, in the translation processes among the three poles of the diagram. This chapter will focalize the role played by a specific class (spatial-annotation capable digital devices) of ICTs in these processes.

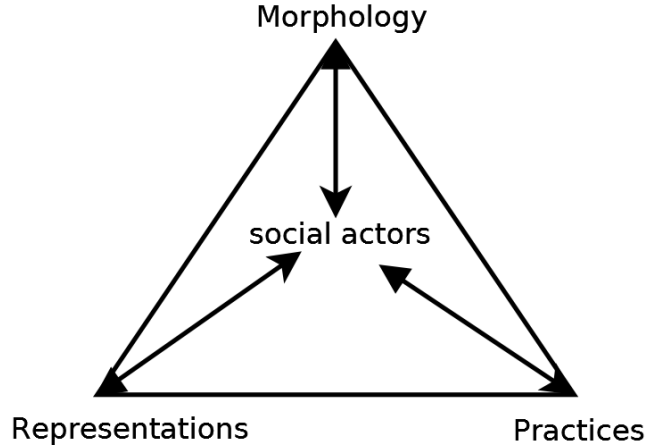

Figure 1 The RPM Model and its translation lines

The first part of the chapter discusses the practice of "spatial annotation" (i.e., augmenting a map with discourse) in relation to "tourist experience," which is intended to be the set of social practices connected to the "tourist gaze" (Urry 1990, 1992; Urry

and Larsen 2011). The latter is a particular regime of perception that relies upon the expectation of experiencing something "out of the ordinary" (for a critique on the "gaze" metaphor in favor of a more multisensorial performance-centric approach, see for example Chambers 2012; Perkins and Thorns 2001).[1] "Tourism" is discussed in the chapter in relation to sociospatial production patterns because the production and consumption of "out-of-ordinariness"—upon which tourism depends—entails a combination of the following: an effort of meaning-making by all social actors involved; specific physical configurations of spaces; and specific practices and recognizable social identities and attitudes. The second part of the chapter discusses how location-based social networks, such as Foursquare or TripAdvisor, affect the political dimension of this "tourism-focused" spatial annotation. Because of the popularization of the practice granted by such platforms, the authoritativeness of spatial annotation loses some of its "taken-for-grantedness" (which has never been absolute) and has to rely on complex negotiations with human and nonhuman entities, including other users, algorithms, and bots. Through a case study, the third and final part of the paper discusses how this kind of tourism-focused LBSN-assisted spatial annotation could play a role in processes of civic engagement.

Spatial Annotation and the Tourist Experience

"Spatial annotation" is the practice by which a layer of information (i.e., a meaningful ensemble of signs) is integrated into a map—that is, a visual-spatial representation of physical space centered on the spatial structural relations among its elements (Johnson-Laird 1983), which is communicated through arranged geometric primitives.

Maps are special kinds of diagrams. They have a scale that is used to communicate distances, a projection, that is used for communicating directions and finally a set of abstract signs, a part of which may be text, for communicating the semantic meaning of landscape features. . . .Maps record what is known and remembered about an environment and act as a support to wayfinding. In the absence of these artifacts, people rely on internal representations, or memories, of experienced environments. (Cherubini 2002, 28)

Annotations confer specific *meanings* on space, concerning elements such as resources available, relative importance, or the role of a space within paths of movement. Fairbairn (1993) stresses that without annotations, maps are effectively useless (and not even properly "maps"). Moreover, the signifying capability of maps is central to their ability to produce territorialities—that is, spaces invested by social groups with meanings.

Although they are not extensively examined in tourism studies (Del Casino and Hanna 2000), annotated "tourist" maps are crucial for the traveler experience insofar as they signal elements on which their gaze can be legitimately focused. These maps (given away, displayed at various locations, or included in tourist guides) mark the locations of monuments and other "sites of interest." They offer a hierarchy of meanings and spaces that guide the tourist through and in space. Annotated maps tell us what we need to engage with in order to *perform correctly* as tourists—that is, to exercise the "tourist gaze" properly. They help during all of the tasks identified by Reichenbacher (2001): *locator* (finding out where one is); *proximity* (finding out what is close to one's current position); *navigation* (finding out how to reach a place); and *event* (finding out what is happening at a place).

Tourist maps are, of course, not alone in structuring the tourist gaze/performance. The complex of expectations and mental projections is also shaped by conversations, variously mediated texts, previous experiences, and so on. These act on what Lynch (1968) famously defined as "mental maps," or psychological syntheses of space through which we orient ourselves. This close relationship between maps and mental representations also helps us to distance ourselves from any essentialist vision of maps as agents *external* to the world they represent. As Wood and Feels (2008) remarked, "Maps do not represent the world, they make the world." Farìas (2011) expressed this equivalence in unambiguous terms when he wrote that "Tourist maps can be understood as bearers of tourists' environmental images that, rather than being mental, are inscribed in durable and visible materials such as paper sheets, guidebooks, flyers, and brochures" (1). Theoretical reflection on the relationship between map-using, mapmaking, and space has moved from uncovering their interconnecting "meanings" to understanding the "affects" that tie them together (Whatmore 2006, 604).

From the perspective of the RPM model, we could say that annotated maps help co-construct the objects of the tourist gaze by acting on key translations among the various levels. For example, they may legitimize the *preservation* of sites annotated as attractions, thus affecting their physical appearance. They may also legitimize some tourist practices enacted in these sites (e.g., photographing, staring, grouping). These two elements not only feed on each other but also on the map artifact. The icons that are often used to annotate tourist maps attempt to simulate the appearance and reciprocal distance of attractions, with varying results (e.g., Leung and Li 2002). Thus, the appearance of the map represents a translation of the physicality of the attraction itself. Moreover, the spatial production process that entails the tourist map helps to coshape the social identity assumed by the social actor performing it; they may adopt (if only temporarily) a set of values, meanings, and self-presentation strategies that are codified as part of the "tourist" identity in order to enact similarly culturally-codified "tourist" practices (Edensor 2001). This identity construct is certainly inscribed in the map as its "model reader" (Eco 1984), yet it must be very clearly stated that the "tourist space" is produced by an *heterogeneous* network of actors and artifacts, which also *enrolls* annotated maps as representational technologies, and not that tourist maps *drive* (in a technological determinist sense) certain specific spatial production patterns.

Furthermore, because tourist space is *valuable*, the hierarchy of meanings of annotated tourist maps is the product of various negotiations internal to this network. Deciding where and how to annotate a tourist map are also *political* issues (for a discussion see Rossetto 2012). A core concern about this kind of negotiation is the needs attributed to the aforementioned "model reader" of the map. The question *"What kind of tourist is this map destined to?"* is important in the map-making process because the same space (e.g., the same city)[2] may offer to different "model readers" a plurality of tourist experiences, each translated into specific set of signs on specific maps. While arguably the most diffused is what Urry calls "service-class" tourism (relying upon a gaze exercised on objects that are neither perceived as "popular" nor "elitist"), a number of other tourist experiences exist to cater to specific interests (Isaac 2009). For example, "supernatural" tours maps regard sites where

séances or apparitions allegedly took place (Holloway 2010; Inglis and Holmes 2003; Valdez 2010) and "crime" tours do the same at sites related to environments where violent acts took place or personalities frequented (Gibson 2006; Strange and Kempa 2003).

A key element of all these maps (and experiences) is a particular object, which MacCannell (1976) defined as the *attraction*: "the empirical relationship between a tourist, a sight and a marker (a piece of information about a sight)." This scheme is not very far from the relationship between "practices," "physicality," and "representations," although in MacCannell, the social identity of the tourist and its practices correspond to the same pole, whereas in the RPM model they are (if only analytically) separated. In RPM terms, the production of an attraction is a process through which a social group confers a shared meaning (a shared representation) upon a space, which, therefore, becomes a *symbol*. As a symbol, it requires a degree of *stabilization* because unstable ones lose their function. That is to say, attractions need to remain the same through time. As MacCannell stresses, this is translated into a *sacralization* of the space (in itself another representations), which in turn requires the *delimitation* of the non-mundane area from the mundane. This translates into a redefinition of the range of legitimate and illegitimate practices that can be enacted in the space. Because of this, the delimitation needs to be *enforced*, which transmutes into the physical—building walls, gates, and fences—and/or into the practice levels, such as by regulating access. This enforcement also requires the gathering of *consensus*. For most known attractions, this is delegated to the involvement of state (or otherwise official) institutions, which, as embodiments of power and consensus, are legitimized to perform this kind of sanction and to exercise power to enforce delimitations.

However, other forms of production of attractions exist. For example, the preservation of the place identity of subcultures (Hebdige 1995) can drive attempts directed toward spaces such as music halls and clubs. Subcultures occasionally gather enough power or resources to confer obduracy on their attempts. Other social groups may not be as successful: for example, groups of friends might make into "private attractions" spaces where they used to play as children—such as playgrounds—but be powerless against their transformation or dismissal.

Spaces are thus made into "attractions" worthy of preservation (see also Jones 2003; Lowenthal 1985), primarily through the stabilization within a social group of their role as *symbolizing something else*, which makes them, primarily, spaces that are *out of the ordinary*. Annotated maps are powerful agents for legitimizing this kind of representation. By conferring a specific meaning to a space, spatial annotation brings a space out of the ordinary, transforming it into a potential object for the tourist gaze.[3]

Indeed, part of the tourist gaze implies a process of "decoding of attractions;" that is, the interpretation of the shared meaning conferred to a space is annotated as a legitimate object for a tourist gaze. This role is often played by tourist guides, who expand the spatial annotations of tourist maps with broader texts decoding the "meaning" for the reader (e.g., by answering such questions as *"Why is this an attraction?" "What does it stand for?" and "For whom?"*). Examples of *ambiguous attractions* can often be found in tourist sites featuring rocks with human, animal, or otherwise recognizable shapes. Without the support of tourist guides, tourists would often be unable to perceive the resemblance of the rocks to their connected human, natural, or animal forms. Although part of the ludic experience is precisely in the decoding process, failure can easily turn into frustration, thus destroying the tourist experience by delegitimizing their gaze. As the object becomes unfit for the gaze, the tourist perceives her time as wasted and rejects the object.

Hence, the annotation of tourist maps safeguards the tourist experience by legitimizing the gaze and driving it towards "safe" objects. In doing so, it helps to stabilize the flow of people and resources towards the attraction. Moreover, it indicates where the tourist can safely perform the "tourist identity," however variously connoted (see McCabe 2005), while legitimately coproducing the "tourist space" (Edensor 2001).

Until the mid 2000s, the annotation of tourist maps was a practice mostly connected with the tourist industry and, in general, with tourist institutions. User annotations on these maps (e.g., notes and paths), while frequent, possessed limited social visibility and therefore had a negligible effect on processes involving the production of attractions. Although annotated "subcultural" maps have always enjoyed some degree of circulation, smaller or less cohesive social formations have had little means (and possibly

interest) of circulating their own annotated cartographies. Since the mid 2000s, developments in spatial annotation software have changed this situation, thus reversing the established relationship between cartography and annotation. Annotation has become a practice independent from, but still closely related to, cartographic efforts. Furthermore, the accessible annotation practices allowed by the evolution of GIS-enabled software have become to some extent a *part* of the tourist experience, which is the topic of the following section of this paper.

Spatial Annotation Apps and the Tourist Gaze

Spatial annotation has developed into an affordance of software for geographic representation, allowing users to annotate computationally generated maps of space; applications of this type have been available since the early 1960s (Foresman 1998). Recent developments in this class of software incorporate data from GIS sensors (such as GPS and Wi-Fi radios) giving the device a degree of positional awareness. The popularization of GIS-enabled portable devices, such as mobile phones, PDAs, and multimedia readers has increased the penetration of this kind of application wherever wireless data networks and GPS coverage reach a significant number of users. Hence, as a social practice, spatial annotation has entered its "mainstream" phase. Applications, such as Foursquare, Google Maps, or Facebook Places, allow users to attach geocoordinates easily to text and audio/visual materials, which effectively ties an annotation to a place, and then visualizes other people's annotations according to a system of filters and queries.

As early as the 1990s, digital maps for tourists have been available, even featuring geolocalization capabilities (Sigala and Marinidis 2009). Paper-based tourist maps have, however, remained the dominant technology. In their explanation of the lack of success of digital tourist maps, Norrie and Signer (2005) observed paper's "easiness of annotation," as well as the social component of tourist practice. They found that "combining and comparing information is a key tourist activity and much of the enjoyment of the visit is the social interaction involved in these tasks of dynamically planning activities and learning about the environment." The authors deemed such practices as less feasible on the smaller screens

of most portable digital devices that were available in 2005. Hence, the affordances of these ICTs made difficult their enrollment in the network producing tourist space.

These problems have been partially solved by the new applications, such as Locative Mobile Social Networks (LMSN) or Location-Based Social Networks (LBSN) (De Souza e Silva and Frith 2010; Gordon and De Souza e Silva 2011). These offer easy, accessible, and socially networked spatial annotation integrated in well-established platforms such as the mobile phone, which has significant implications. First, socially networked spatial annotation offers users stronger payoffs than do simple digital tourist maps. In a previous paper (Tarantino and Tosoni 2013b), we identified that the usage of this kind of software is nontrivial and indeed quite demanding. Its requirements include, for example, interruption of routine, the availability of certain technologies, battery and data consumption, knowledge of the application's existence and of its workings, and so on. Significant benefits are required, especially if the aim is to engage the user in repeated, long-term use. In social networking applications, the social capital of the user is the primary resource invested and on which returns are expected. Users employ social applications because they expect to gain prestige, charisma, and desirability in the eyes of others. Therefore, their pattern of adoption tends to follow the scale-free network model (Barabasi 1998), insofar as the capability of a node to attract new users is proportional to the number of its existing connections.

The scale-free model applies to both the service utilized and the spaces annotated. Concerning the former, the majority of users tend to avoid duplicate efforts. For example, if an actor in Foursquare has already annotated a space, the same actor may not want to do it again in another application. This is especially true because social applications tend to be connected to users' Facebook and Twitter accounts to maximize the visibility of both the brand and the user. Thus, with regard to tourism-oriented applications, smaller, city-specific applications developed by tourism offices might remain vacant because Foursquare has the majority of the activity share. Hence, many cities have started to form partnerships with Foursquare to capitalize on its popularity and reduce development costs; such efforts include Chicago, Madrid, and Milan. In other words, traditional players in the tourism industry enter the network

by producing new maps and attempting to impose and stabilize representations and meanings about a place. However, their control of this stabilization in the case of LBSNs is much more problematic than it is in the case of printed maps.

Second, the scale-free model applies to the places annotated. All the systems discussed in this paper are based on a centralized client-server structure in which databases record all the activity of their users, which produces a first-level, unavoidable annotation: the quantification of interactions performed around the same geographic coordinates. Many of these applications (e.g., Foursquare) make this explicit by publishing the "check-in" data related to a space. The number of interactions (that is, the number of "presences," that are recorded in a place) acts as a signifier—for example, the measure of the salience of the place in the economy of people's mobility. This is relevant for the tourist experience because the shared prominence of a place is an element of the attraction. Urry (1990, 118) discusses objects for which "the fame of the object itself" renders them appropriates objects for the tourist gaze (i.e., the fame of the object becomes its meaning). In recent years, there has been a great interest (see Chen, Battestini, Gelfand, and Setlur 2009; Xie and Newsam 2011) in the use of algorithms for the automatic generation of tourist maps drawing upon visual shared data—for example, location pictures shot by users—and generating landmark icons based on syntheses of this pictorial material. These algorithms generate the visual part of the annotation based on ego-centered accumulated salience. In RPM terminology, "spatial practice" (e.g., being somewhere, taking pictures) is translated by this software into representations of space (i.e., spatial annotations). On a lesser scale, Foursquare also capitalizes on ego-centered accumulated salience by allowing users to see the places where friends have been. This filter shows on the map places with the largest amount of check-ins performed by socially connected users. All these are ego-centered cartographies that rely on the tendency towards homophily, which is typical of social networking services (McPherson, Smith-Lovin, and Cook 2001).

Of course, these services also feature a greater number of articulated annotation options. Users can leave comments, advice, or recommendations about locations. This kind of annotation is

central to platforms that are explicitly oriented towards driving the tourist gaze, such as TripAdvisor. While available research indicates that users are more likely to express negative than positive sentiments when annotating a location (Cheng, Caverlee, Lee, and Sui 2011), annotating a space appears to have become a part of the tourist experience itself for LBSN-connected tourists. An explanation can be found in Urry's (1990, 5) observation that in advanced societies, tourism is a marker of status. Spatial annotation on LBSNs acts as a confirmation of the touristic endeavor to a user's social graph. Thus, social actors perceive social capital and prestige as potentially increased by spatial annotations, even negative ones.

Because of these affordances, when they are enrolled in the production of tourist space, these technologies tend to problematize the stabilization role traditionally played by spatial annotation with respect to the meanings attributed to spaces. Contradictory annotations about a space are often placed side-by-side and are ordered and filtered by algorithms centered on ego-centered accumulated salience. Although socially networked annotation maintains the role of directing the gaze and bringing places out of the ordinary (even more so as augmented reality applications become more and more diffused),[4] it loses some of its traditional ability to impose and stabilize specific meanings and representations on space by showing them on a map. Consequently, patterns of spatial production enrolling these technologies might no longer rely upon this stability as granted, requiring instead a more direct involvement from the user in filtering the representations based on the queries and parameters of her choice. Therefore, the querying of annotations acquires a substantial importance, as do the ethical and political dimensions entailed by the design of the filtering options. This should make them a worthwhile object of inquiry for critical cartography. Moreover, in Latour's terms, the heterogeneous network producing these new maps has come to comprise a number of new actants and logics, such as bots, which are algorithms exploiting precisely accumulated salience to select spaces to target with spam annotations (Signorini, Polgreen, and Segre 2011). Such spam annotations increase the "quantitative" salience of space while diminishing the "qualitative" salience of the overall map; for, as research has shown, spam reduces credibility

and user attachment to a website (Hayati et al. 2010; Ma and Li 2012). Bots, therefore, affect socio-spatial production processes.

As spatial annotation loses power in stabilizing its meanings, it also loses its ability to stabilize the model reader of the map. However, this function is partly assumed by the context of the map—that is, the application itself. The "tourist" remains the model reader inscribed in much of unspecialized LSBNs (such as Foursquare, Yelp, and Gowalla) whose interfaces are largely centered on notions of leisure and the guided discovery of "new," "exciting," and "interesting" places. (This is the particular case of the latest versions of Foursquare: including "recommendations.") More than utility, the most successful LBSNs promise the experience of spaces out of the ordinary. In other words, they promise tourism in the context of ordinariness.

Finally, as we will see in the final section, the design choices concerning the specific affordances of annotation play important roles in the spatial production processes that enroll this kind of technology.

Heal the City: a Tourist Space for Civic Engagement

From September to December in 2012, we experimented with MIT Mobile Experience Lab's OpenLOCAST engine[5] to develop a prototype application that allowed users to use either an app or web-based interface and annotate georeferenced elements of their choice within the area of Milan as either "valuable" or "problematic." The system required photographic evidence of the area under study and required a brief explanation of the annotations. Sixty MA and BA students were enrolled to test the application in its prototype phase and populate its database. The application was designed to consider the requirement that users had to annotate a space in either positive or negative terms: any annotation must include an evaluation.

HTC's "negative reporting" function is similar to existing applications, such as the British FixMyStreet (Baykurt 2012; King and Brown 2007) or the American SeeClicFix.com and MyDelaware (Evans-Cowley 2012). These applications provide citizens with interfaces to signal problems such as graffiti or potholes to public administrations; all declare the shared objective of boosting "civ-

ic engagement" in citizens by promoting the care patterns of the city. The theory underlying this objective is based on the concept of "crowdsourcing"—that is, the signaling of urban problems by effectively using "people as sensors" (Laituri and Kodrich 2008). Crowdsourcing leads to (a) greater awareness of the problems as they are spatially annotated on a map (thus they are brought out of the ordinary, made into attractions to signify for institutional inadequacy), and (b) emotional attachment to those problems (as each user's "own" problems). In this model, both (a) and (b) rely upon the feeling of "empowerment" granted by the application's affordances to the citizen. Moreover, by capitalizing on the visibility of ego-centered accumulated salience offered by GIS social applications, crowdsourcing applications intend to promote political consensus with regard to enforcing spatial transformation by forcing institutions to deal with the issues made visible by spatial annotation practices.[6] In RPM terms, these applications attempt to translate a morphological feature of space (e.g., a pothole) into a shared representation of space as "problematic" in order enroll institutional support and legitimize a spatial practice (e.g., fixing the pothole), which in turn would translate into a new morphology of space (e.g., smooth road).

In designing Heal the City, we thought that while those applications do much good, their influence on socio-spatial processes could be made stronger. As Baykurt (2012) remarks, these applications are currently focused on a problem-centered, immediate, and short-term notion of civic engagement. Indeed, the question of how to sustain a long-term involvement with urban space is not central in these projects: this is because we argue that these applications do not engage citizens as such, but merely as sensors, and we expect this sensor role to self-promulgate by the satisfaction of seeing problems solved or conversely on the indignation of not seeing solutions to them. These applications tend to ignore the non-triviality of the effort they ask of users, and they do not offer significant benefits for the long-term involvement in the care of urban space.

We thought that a spatially bound motivation mechanism might ameliorate this shortcoming. In HTC, we introduced the notion of *positive* annotations not because we intended to "balance" naive negativity with positivity, but because we wanted to make the symbolic investment of citizens (or city users) into ele-

ments of urban space that were as equally visible as the problems were. Through the production of attractions via spatial annotation, we sought to foster a representation of urban space as an object of symbolic investment (and not simply as a functional background for daily life). We intended to establish a circuit between positive and negative annotations by which reporting issues would be motivated by the investment in urban space. We intended to capitalize on ego-centered accumulated salience (with a system of filters offering the user the possibility of seeing their contacts' activity) to accrue the investment and therefore motivate the reporting.

In RPM terms, HTC forces its users to make objects into attractions as symbols of either the desirability of the city or of institutional negligence. In the former, users increase the value of their position as citizens or city users, and therefore they legitimize the instances presented through the latter. Their spatial annotations therefore help; on the one hand, to drive resources towards "worthwhile" spaces (which require preservation), while at the same time enroll institutions to transform "problematic" spaces, in both cases influencing their physicality.[7]

Therefore, early in the design phase we discarded unspecialized LBSNs, such as Foursquare, because the unspecificity of their annotation features would have broken the desired circuit: annotations are made on these platforms for all kinds of needs. Instead, we chose to force users to describe spaces as *either* good or bad. This design choice certainly limited the annotation possibilities of users, but it allowed us to fit our model user into a precisely defined, spatial production pattern. HTC intended to produce "attractions" in which at least a part the significations of the space was explicit and immediately visible. We designed the application be enrolled in the spatial production of a specific kind of *tourist space*.

The platform's affordances also contributed to the emergence of "ambiguous attractions," which were annotated differently by different groups of users. One clear example was the external walls of a female dormitory of the Catholic University of Milan. Because nuns manage the dormitory, males are strongly forbidden. However, the external walls featured graffiti with love declarations to the girls residing inside. The first HTC user annotating the wall declared it a "problematic" element, which aligns with the dominant social view

of graffiti as vandalism. Subsequently, other users tried to establish another meaning and annotated it as an attraction; specifically, as a sort of installation featuring years of "popular love poetry." Other users were subsequently attracted by the hitherto "unseen" space, and strong debates emerged among users concerning the wall's monumentality. The space was thus brought "out of the ordinary" and became an object of the tourist gaze, that is, as a part of the tourist experience, if only as a *controversial* object.

Conclusion

The effects of mass-diffused, socially networked spatial annotations are of course multiple and complex. In this last section, I will focus on two. The first is a positive assessment, which motivated our effort in building HTC. While tourism and civic engagement are often viewed as contradictory, the adoption of a broader, processual perspective on the production of touristic space would see that they are connected by a similar symbolic investment in "attractions," albeit of opposite qualities. McCallan (1976, 40) remarked on the value of such a circuit:

A touristic attitude of respectful admiration is called forth by the finer attractions, the monuments, and a no less important attitude of disgust attaches itself to the uncontrolled garbage heaps, muggings, abandoned and tumbledown buildings, polluted rivers and the like. Disgust over these items is the negative pole of respect for the monuments. Together, the two provide a moral stability to the modern touristic consciousness that extends beyond immediate social relationships to the structure and organization of the total society.

McCallan's formulation implied a critical dimension: a specific form of conservative power is at work in this rebalancing. Although the critique may be valid, the process described retains its validity. "Touristic consciousness" can act as a potential motivational source of "civic engagement." HTC's main aim was to exploit some affordances of LBSNs (e.g., permanence, penetration, scalarity, and investment) to maximize this potential. In other words, socially networked spatial annotation can help the adoption of a "touristic look" on one's own city by weakening the processes of banalization and routinization. Furthermore, a "touristic look" could help

motivate citizens' efforts to maintain and improve the city.

The second implication of the popularization of socially networked spatial annotation is more critical. In our discussion, we identified that spatial annotations shape representations of space and representations of space coshape spatial morphology and spatial practices. We also discussed that individual social groups possess their own maps and annotations (especially mental maps). As the annotations of different actors converge on the same platform, sociospatial conflicts become more visible. Our relatively innocuous example of the building wall has problematic counterparts on other platforms. For example, some users annotate the presence of migrants in public spaces as problematic, creating indignation (and prompting the intervention of administrators to cancel the annotation). Another example concerns nightlife spaces, which are typically annotated on Foursquare to convey a number of characteristics that range from exciting to noisy and troublesome. Socially networked spatial annotation maps thus make sociospatial conflicts more *visible*, instead of hiding or normalizing them, for which traditional mapping and spatial annotations have been criticized.

Becoming publicly visible, however, also means running risks of crystallization. While socially networked spatial annotations might provide a means for their resolution through the possibilities of debate afforded by this new public arena (coherently with optimistic readings of Web 2.0), ego-centered accumulated salience might also fuel their radicalization and stiffening precisely because of the close ties with a user's annotations with his or her social capital and self-representation. In other words, the visibility of sociospatial conflicts on LBSN might attract social actors to take a position in the conflict by adding their own annotations to the space. They would be attracted by an expected return in terms of perceived social prestige and visibility, which would be granted precisely by the visibility of the conflict. However, once taken, because of the affordances of the software platforms utilized (e.g., degree of permanence, the use of real names and pictures as avatars, or the lack of "reply" buttons as in the case of Foursquare) these positions might be impervious to subsequent adjustment and compromise. Hence, socially networked spatial annotations might actually make the solution of socio-spatial conflicts more

difficult. However, specialized research on the correlations between the use of LSBNs and civic engagement and on the development of sociospatial conflicts within LBSNs is needed to test both the implications discussed in this section.

References

Barkowsky, Thomas, and Christian Freksa. "Cognitive Requirements on Making and Interpreting Maps." In *Spatial Information Theory: A Theoretical Basis for GIS*, edited by Stephen C. Hirtle and Andrew U. Frank, 347–61. Germany: Springer-Verlag Berlin Heidelburg, 1997. [Au: not in text.]

Bauer, Malcolm I., and P. N. Johnson-Laird. "How Diagrams Can Improve Reasoning." *Psychological Science* 4, no. 6 (1993): 372–378. doi:10.1111/j.1467-9280.1993.tb00584.x [Au: not in text.]

Baykurt, Burcu. "Redefining Citizenship and Civic Engagement: Political Values Embodied in FixMyStreet.com." IR12: Performance and Participation (2012). *Selected Papers of Internet Research* (ISSN 2162-3317).

Callon, Michel. "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Brieuc Bay." In *Power, Action and Belief: A New Sociology of Knowledge*, edited by John Law. New York: Routledge Kegan & Paul, 1986. [Au: page numbers?]

Chen, Wei-Chao, Agathe Battestini, Natasha Gelfand, and Vidya Setlur. "Visual Summaries of Popular Landmarks from Community Photo Collections." In *Proceedings of the 17th ACM international conference on Multimedia*, 789–92. Beijing, China: ACM, 2009.

Cheng, Zhiyuan, James Caverlee, Kyumin Lee, and Daniel Z Sui. "Exploring Millions of Footprints in Location Sharing Services." *ICWSM* (2011): 81–8.

Culler, Jonathan. "Semiotics of Tourism." *American Journal of Semiotics* 1, no. 1-2 (1981): 127–40. [Au: not in text.]

De Souza e Silva, Adriana, and Jordan Frith. "Locative Mobile Social Networks: Mapping Communication and Location in Urban Spaces." *Mobilities* 5, no. 4 (2010): 485–505.

Del Casino, Vincent J., and Stephen P. Hanna. "Representations and Identities in Tourism Map Spaces." *Progress in Human Geography* 24, no. 1 (2000): 23–46.

Dietler, Michael. "A Tale of Three Sites: the Monumentalization of Celtic Oppida and the Politics of Collective Memory and Identity." *World Archaeology* 30, no. 1 (1998): 72–89. [Au: not in text.]

Duran, E., D. Z. Seker, and M. Shrestha. "Web-Based Information System for Tourism Resort: A Case Study for Side/Manavgat." In *Proceedings for XXth International Society for Photogrammetry and Remote Sensing, Istanbul, Turkey, July 12–23*, 2004. [Au: not in text.]

Eco, Umberto. *The Role of the Reader: Explorations in the Semiotics of Texts*. Bloomington: Indiana University Press, 1984.

Edensor, Tim. "Performing Tourism, Staging Tourism (Re) Producing Tourist Space and Practice." *Tourist Studies* 1, no. 1 (2001): 59–81.

Evans-Cowley, Jennifer. "There's an App for That: Mobile Applications for Urban Planning." *International Journal of E-Planning Research (IJEPR)* 1, no. 2 (2012): 79–87.

Fairbairn, David J. "On the Nature of Cartographic Text." *The Cartographic Journal* 30, no. 2 (1993): 104–11. doi:10.1179/000870493787860157.

Foresman, Timothy W. *The History of Geographic Information Systems: Perspectives from the Pioneers*. Upper Saddle River, NJ: Prentice Hall, 1998.

Gibson, Dirk C. "The Relationship between Serial Murder and the American Tourism Industry." *Journal of Travel & Tourism Marketing* 20, no. 1 (2006): 45–60.

Gordon, Eric, and Adriana de Souza e Silva. *Net Locality: Why Location Matters in a Networked World*. United Kingdom: Wiley-Blackwell, 2011.

Hayati, Pedram, Vidyasagar Potdar, Alex Talevski, Nazanin Firoozeh, Saeed Sarenche, and Elham A. Yeganeh. "Definition of Spam 2.0: New Spamming Boom." Paper presented at the 4th IEEE International Conference on Digital Ecosystems and Technologies (DEST), Dubai, United Arab Emirates, April 2010.

Hebdige, Dick. *Subculture: The Meaning of Style*. London: Routledge, 1979. [Au: the body text says the date is 1995. Which date is correct?]Holloway, Julian. "Legend-tripping in Spooky Spaces: Ghost Tourism and Infrastructures of Enchantment." *Environment and Planning D: Society and Space* 28, no. 4 (2010): 618–37.

Inglis, David, and Mary Holmes. "Highland and Other Haunts: Ghosts in Scottish Tourism." *Annals of Tourism Research* 30, no. 1 (2003): 50–63.

Isaac, Rami K. "Alternative Tourism: Can the Segregation Wall in Bethlehem be a Tourist Attraction?" *Tourism and Hospitality Planning & Development* 6, no. 3 (2009): 247–54.

Jones, Andrew. "Technologies of Remembrance." In *Archaeologies of Remembrance: Death and Memory in Past Societies*, edited by Howard Williams, 65–88. New York: Springer, 2003.

King, Stephen F., and Paul Brown. "Fix My Street or Else: Using the Internet to Voice Local Public Service Concerns." Paper presented at the Proceedings of the 1st International Conference on Theory and Practice of Electronic Governance, Macao SAR, China, December 2007.

Laituri, Melinda, and Kris Kodrich. "On Line Disaster Response Community: People As Sensors of High Magnitude Disasters Using Internet GIS." *Sensors* 8, no. 5 (2008): 3037–55.

Latour, Bruno. *Pandora's Hope: Essays on the Reality Of Science Studies*. Cambridge, MA: Harvard University Press, 1999.

Lefebvre, Henri. *The Production of Space*. Vol. 30. Oxford: Blackwell, 1991.

Leung, Lisa F., and Zhi L. Li. "Experimental Evaluation of the Effectiveness of Graphic Symbols on Tourist Maps." *Cartography* 31, no. 1 (2002): 11–20. doi:10.1080/00690805.2002.9714176.

Lowenthal, David. *The Past is a Foreign Country*. Cambridge, MA: Cambridge University Press, 1985.

Ma, Yingying, and Fengjun Li. "Detecting Review Spam: Challenges and Opportunities." Paper presented at the 8th International Conference on Collaborative Computing: Networking, Applications and Worksharing (CollaborateCom), October 2012.

MacCannell, Dean. *The Tourist: A New Theory of the Leisure Class*. Berkeley: University of California Press, 1976.

McCabe, Scott. " 'Who is a Tourist?' A Critical Review." *Tourist Studies* 5, no. 1 (2005): 85–106.

McPherson, Miller, Lynn Smith-Lovin, and James M Cook. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* (2001): 415–44.

Noh, Jang Suh. "Heritage Authenticity and Monumentalization for Political Power-A Case Study of the Cheonggyecheon Resto-

ration Project in Seoul, Korea." PhD diss., Silpakorn University, 2009. http://www.thapra.lib.su.ac.th/objects/thesis/fulltext/thapra/Jang%20Suh_Noh/Fulltext.pdf. [Au: not in text.]

Norrie, Moira, and Beat Signer. "Overlaying Paper Maps with Digital Information Services for Tourists." In *Information and Communication Technologies in Tourism 2005*, edited by Andrew J. Frew, 23–33. Vienna: Springer, 2005.

Perkins, Harvey C, and David C Thorns. "Gazing or Performing? Reflections on Urry's Tourist Gaze in the Context of Contemporary Experience in the Antipodes." *International Sociology* 16, no. 2 (2001): 185–204.

Rakić, Tijana, and Donna Chambers. "Rethinking the Consumption of Places." *Annals of Tourism Research* 39, no. 3 (2012): 1612–33.

Reichenbacher, Tumasch. "Adaptive Concepts for a Mobile Cartography." *Journal of Geographical Sciences* 11, no. 1 (2001): 43–53.

Rossetto, Tania. "Embodying the Map: Tourism Practices in Berlin." *Tourist Studies* 12, no. 1 (2012): 28–51.

Sigala, Marianna, and Dimosthenis Marinidis. "Exploring the Transformation of Tourism Firms' Operations and Business Models through the Use of Web Map Services." Paper presented at the European and Mediterranean Conference on Information Systems, Izmir, Turkey, July 2009.

Signorini, Alessio, Philip Polgreen, and Alberto Segre. "Inferring Travel from Social Media." Paper presented at the 10th Annual Conference of the International Society for Disease Surveillance, Atlanta, GA, December 2011.

Strange, Carolyn, and Michael Kempa. "Shades of Dark Tourism: Alcatraz and Robben Island." *Annals of Tourism Research* 30, no. 2 (2003): 386–405.

Tarantino, Matteo, and Simone Tosoni. "Media and The Social Production of Urban Space: Towards an Integrated Approach to the Controversial Nature of Urban Space." In *Media & The City: Urbanism, Technology, Communication*, edited by Simone Tosoni, Matteo Tarantino, and Chiara Giaccardi. Newcastle Upon Tyne, UK: Cambridge Scholar Publishing, 2013a.

i———. "Spatial Annotation for the Improvement of Urban Space." Paper presented at the LOCAST Symposium, Cambridge, MA, January 28, 2013(b).

Tosoni, Simone, and Matteo Tarantino. "Media Territories and Urban Conflict: Exploring Symbolic Tactics and Audience Activities in the Conflict over Paolo Sarpi, Milan." *International Communication Gazette* 75, no. 5-6 (2013a): 573–94.

———. "Space, Translations and Media." *First Monday* 18, no. 11 (2013b).

Urry, John. *The Tourist Gaze: Leisure and Travel in Contemporary Societies*. London: Sage, 1990.

———. "The Tourist Gaze 'Revisited.'" *American Behavioral Scientist* 36, no. 2 (1992): 172–86.

———, and Jonas Larsen. *The Tourist Gaze 3.0*. London: Sage Publications Limited, 2011.

Valdez, Raúl. "Ghost Legends from the Historical District of Puebla, Mexico: A Complementary Tourist Attraction?" *Estudios y Perspectivas en Turismo* 19, no. 4 (2010): 553–69.

Whatmore, Sarah. "Materialist Returns: Practising Cultural Geography in and for a More-Than-Human World." *Cultural Geographies* 13, no. 4 (2006): 600–9.

Xie, Ling, and Shawn Newsam. "IM2MAP: Deriving Maps from Georeferenced Community Contributed Photo Collections." Paper presented at the Proceedings of the 3rd ACM SIGMM International Workshop on Social Media, Scottsdale, AZ, November/December 2011.

Endnotes

1 Indeed, Urry himself had discussed "gazing" as a "collection of signs" (i.e., not necessarily related to sight *strictu sensu*) shortly after the first edition of *The Tourist Gaze*. See Urry 1992.

2 It would be better here to refer to "geographical coordinates," given our option for a socially constructed nature of space; we use the term here only for the sake of simplicity.

3 Notice how, according to this perspective, monuments may signify also such things as "fun" or "pleasure," which gather under "monumentalized" spaces which usually do not pertain there: an

amusement park or a restaurant may be marked on a tourist map because they promise a certain set of experiences.

4 Augmented reality applications such as Layar apply the logic of spatial annotation to three-dimensional 1:1 maps of the world. In doing so, they give the user the possibility of experiencing spatial annotations as a layer perceptually superimposed to the object of the gaze; moreover, the gaze itself could become as an annotation pointer, insofar as we would be able to annotate what we are directly looking at. As far as annotations are concerned, the map would effectively *become* the territory.

5 http://locast.mit.edu/

6 Consider the objectives of FixMyStreet as declared in a PDF document describing: "The first…was to make it much easier to report problems to local governments…by removing the need to know who to write to. The second…was to make these reports public, and (so far as possible) to make information on how they were being responded to by local governments public too…to encourage better performance at fixing this kind of problem, as well as to give local governments a chance to explain why some things were not going to get fixed. . . .The third…was about educating normal people into the idea that they can ask the local government to do things, and that often the government will do what they ask. . . .Even if your local government doesn't often fix problems, or doesn't regularly fix problems, or never ever fixes problems, a website built on the FixMyStreet Platform can still be useful [...] to make it obvious where government is failing." Available at http://code.fixmystreet.com/The-FixMyStreet-Platform-DIY-Guide-v1.1.pdf.

7 Notice how "problematic" spaces, in theory, would require preservation to maintain their symbolic role, and at times and for some social actors 'problematic' monuments are just as desirable as "positive" spaces. For example, the map of large-scale illegal buildings in Italy (known as "eco-monsters") is effectively a map of problematic monuments to institutional negligence, which is functional to a political struggle against this kind of developments. See www.repubblica.it/popup/servizi/2008/ecomostri/ecomostri.html.

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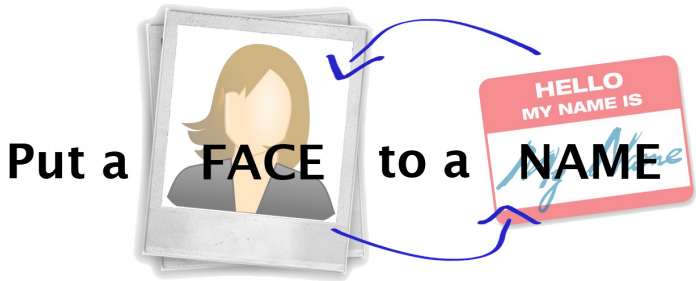
10

Put a Face to a Name: The Use of Photographs in Health Information Systems to Reduce Anonymity and Improve Communication



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Abstract

Communication is critical within healthcare, and is a root cause of most errors in the clinical environment. With increased adoption and use of new information technologies and mediated communication systems that support visual content, hospitals can begin to look at the potential of photographic aids to improve patient satisfaction, clinician communication, and ultimately the quality of care.

Research shows that photographic aids can improve communication by helping people retain information, diminish inaccurate appropriations of facts, and increase feelings of sympathy, compassion and understanding about a person or situation. Making photographs of clinicians and patients available through hospital information systems may increase knowledge of who is part of each patient's care team and may reduce errors in electronic ordering or documentation on the wrong patient. While having readily accessible personal information can ameliorate the current state of affairs, it can also be a source of concern and distress for the stakeholders involved.

Qualitative findings reported in this paper were based on empirical data collected from three sources. The first consisted of qualitative feedback given by ninety-two patients, participants in the Face2Name clinical trial. The second set of data was collected from the clinicians' perspective—from staff involved in the care of patients participating in the Face2Name study. Finally, two additional interviews were collected from staff working at an outpatient clinic that requests and stores photos of their patients' faces. Here, we review the patients' and clinicians' perspectives in support and in opposition to sharing and receiving additional identification information in a healthcare setting.

Background

Information technologies, despite providing unparalleled affordances in the organization and storage of vast amounts of information, as well as eliminating barriers of communication across space and time, have faced resistance penetrating some industries. The healthcare industry is perhaps most infamous for its archaic

use of technology, with physicians continuing to store patient data in manila folders spanning entire clinic walls, and hospitals and health centers continuing to exchange information, referrals, and prescriptions via the fax machines and communicate using pagers. Even after the Health Information Technology for Economic and Clinical Health (HITECH) Act was passed in 2009—an act intended to promote the adoption of health information technology by providing federal incentives to medical practices—less than 50% of healthcare practices in the United States have adopted HIT systems, and even fewer have implemented its meaningful use (Mostashari 2012). As has been highlighted again and again in literature and evidenced by the focus of this conference, having readily accessible information is for many an exciting prospect, while for others a source of concern and distress. Nowhere is this debate more prominent than in healthcare, due to the sensitive nature of the information being shared, which has the potential of leaving both patients and clinicians more vulnerable than ever before (Appari and Johnson 2010).

This paper reports on a quality of care improvement initiative developed for use in concert with hospital information systems (HITs) that provide patients and clinicians with more readily available identification information with the intent to help communication, workflow efficiency, and reduce errors. Findings discussed draw upon empirical evidence used to evaluate the intervention but, more importantly, reveal individuals' orientation towards using such information tools in the future.

Importance of Communication in Hospitals

Communication is directly linked to quality of care (Coiera 2000). Effective patient-provider communication has led to increased disclosure, better medical understanding, and greater adherence to medical treatment plans. Equally important, interprofessional communication has resulted in greater levels of trust across professions (Scott, Rains, and Haseki 2011), a better understanding of roles and responsibilities leading to more effective teamwork and resulting in better patient outcomes (Joint Commission 2007; Baker et al. 2004; Healthcare Benchmarks 2002; Jackson, Chamberlin, and Kroenke 2001; Zinn 1995; Brennan et

al. 1991). Despite the recognized importance of communication on health outcomes, poor communication continues to be a major problem in hospitals (Patient Relations 2011; Leape and Berwick 2005; Brennan et al. 2005; Amalberti 2005). Many aspects influencing communication are difficult to ameliorate, as they are deeply embedded in professional hierarchies, organizational processes, and individual prejudices.

However, breakdowns in communication within hospitals have been identified in such basic aspects as the ability for patients to recognize their physicians and for clinicians to remember and address their colleagues by name (Zwarenstein et al. 2007). Problems with *anonymity* (the degree to which the communicator perceives the sender unknown—referring to issues of familiarity and knowing one by name and/or sight) (Scott et al. 2011), are exacerbated in teaching hospital environments where turnover rates (due to professional medical staff rotations) can be as frequent as three times a day for nurses and every week for attending physicians, residents, and medical students (Zwarenstein et al. 2007) in addition to on-call and weekend shifts. Although there has been an explosion of development of Health Information Technologies (HIT) intended to improve efficiency, some with a focus on communication (Wu et al. 2012) research and HIT advancements often overlook these simple, yet fundamental, deficiencies occurring early in the communication process.

With increased adoption of new information technologies and the ability of these technologies to support visual content, hospitals can begin to look at the potential of photographic aids to reduce anonymity and improve inter-team and inter-professional relations.

Photographic Aids as Tools in Hospitals

There is substantial established literature on the superiority of pictures over other types of stimuli, such as words (names) in memory recall (Kargopoulos, Bablekou, and Gonida 2003). Research shows that photographic aids can improve communication (Hasebrook and Gremm 1999), help people retain information (Glenberg and Grimes 1995), and diminish inaccurate appropriations of facts (Kargopoulos et al. 2003; Glenberg 1995; Houts et al. 2006). Furthermore, photographic aids have been shown to increase

feelings of sympathy, compassion, and understanding about a person or situation (Houts et al. 2006).

Relatively little research has been conducted to evaluate the benefits of using photographs as communication aids in different industries and environments. We have identified only one study that provides patients with photographs of their physicians specifically with the intent to empower patients and improve patient-clinician communication. In 2010, investigators from Vanderbilt University listed a study on the clinicaltrials.gov website that was designed to improve the patient-physician relationship and improve patient satisfaction by providing patients with a "biosketch" card of their attending orthopedic trauma surgeon (Morris, 2010). The card included a picture of the attending orthopedic surgeon with a brief synopsis of his or her education background, specialty, surgical interests, research interests, and other interests (including hobbies). Patients would be randomized into one of two groups: the control group of the intervention group. After being discharged from the hospital, but before the patient's first follow-up clinic visit, each patient would be called by the Vanderbilt University Medical Center (VUMC) for a patient satisfaction telephone survey. However, according to clinicaltrials.gov, there is no evidence that this study started recruiting (Vanderbilt University 2010).

Other studies looking at the provision of patient photographs to clinicians have all focused on reducing "wrong patient" errors (e.g. when a patient is mistaken for another patient and is administered the wrong drug, the wrong dose, has their results confused with another patient, undergoes a procedure intended for another patient) (e.g., Phipps 2012; Agency for Healthcare Research and Quality Healthcare 2012) or juxtaposition errors (orders placed for the wrong patient due to too many Electronic Patient Record, or EPR, system windows opened on the same screen at the same time) (e.g., Hyman et al. 2012). Much of the existing literature on the impact of photographs on team communication and productivity are found in mediated communication and organizational communication contexts. Although some of the existing research on anonymity specifically looks at the provision of photographs and their impact on team trust, collaboration and productivity, we could not find any studies evaluating the impact of clinician photos on interprofessional communication and collaboration.

HITs and Privacy Concerns

One of the greatest barriers facing the further development of HIT systems is the concern for privacy (Appari and Johnson 2010). While the benefits are clear in theory, and experts consider health information technologies critical to transforming the health care industry (Wu et al. 2006; Appari and Johnson 2010), concerns for privacy have often been the reason for the slow rate of adoption or abandonment of pervasive technology in hospitals (Appari and Johnson 2010). Most of the literature concerned with protecting privacy in hospitals reflects either (1) the clinician perspective: access to location and time information that can be used to "track" hospital staff (Tentori and González 2006) or (2) the patient perspective: access to sensitive, generally medical information (e.g., the conditions and health status of patients).

Description of the Face2Name Study and Intervention

"Put a Face to a Name" (Face2Name) is a randomized control trial (clinicaltrials.gov #NCT01658644) that is currently active at a large teaching hospital in Canada. The objective of our research was to develop an intervention that is easily adopted (requires little burden on the part of the users) and improves patient-provider and interprofessional communication by providing patients and clinicians with additional identification information—specifically photographic aids to help in the process of familiarization and recall. The ultimate goal is to have the tool integrated as a standard feature into the hospital's HIT systems. It is important to note that the photographs provided to patients are actually photographs of the *faces* of their clinicians (as opposed to photographs just displaying the physicians from the waist up, or the physicians' entire body). This carries with it some important assumptions: namely, that it is specifically the *faces* that help patients remember and feel closer to their clinicians (as opposed to photographs with some other dimensions). Throughout the paper, we refer to these terms, photographs and faces (of clinicians) interchangeably to indicate the images provided to patients.

Face2Name Part A is a three-armed study that tests whether an intervention (a paper handout) providing patients with

photographs of their clinicians results in better memory recall, improved communication, and increased patient satisfaction. This trial (Part A) is the first phase of several studies undertaken by the hospital with the intent to justify the creation of a multiplatform, online application that both patients and clinicians can access as a resource to help their memory, improve patient-clinician communication as well as inter-professional relations, improve workflow efficiency, and reduce medical errors. The aim is to make the application accessible through personal PDAs (smartphones) and through a desktop platform via any shared hospital computer. The application will draw on different databases in order to display clinicians' photographs, names, roles, and various other information (e.g., schedule meets), organized by medical team, hospital ward (floor), and patient assignment. The intervention is optional and passive in nature; clinicians will be encouraged to use the tool that does not require special investment on their part.

Our proposed intervention does not suggest making available personal health information (PHI) or other sensitive clinicians' personal or patients' medical information, but rather uses personal identification information that is (a) already required of all working staff in hospitals (information stated on their security badges), or (b) already included on patients' government issued health cards (which, in Canada, are required for insurance purposes).

Methods

Each hospital patient is cared for by a multidisciplinary care team, which includes nurses, pharmacists, physiotherapists, occupational therapists, social workers, dieticians, speech-language pathologists, and spiritual care providers. See Figure 1 for a depiction of the frequency of staff rotations on the ward.

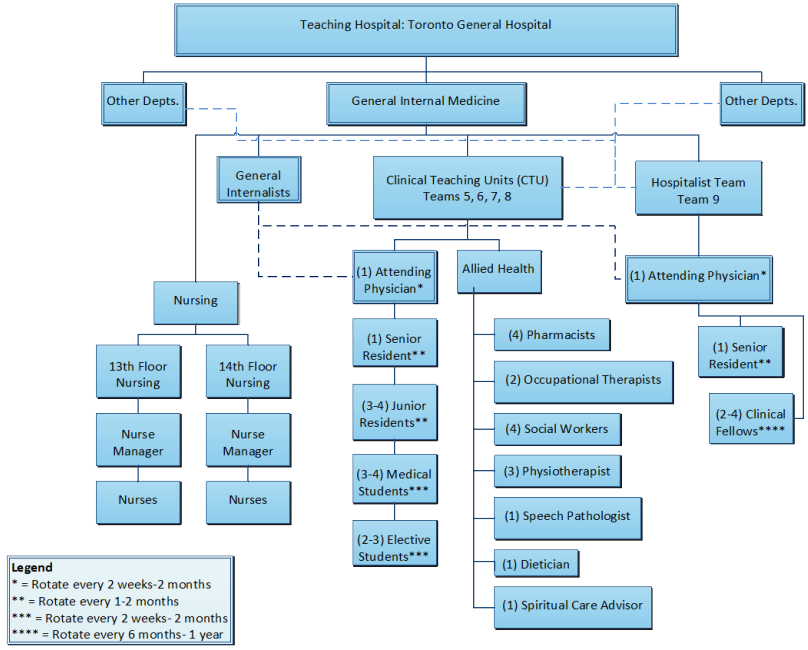

Fig. 1: GIM Staff Rotation Chart

Following the findings as per O'Leary et al. (2010), the research team set the goal for the sample size at 300 patients for Part A, the clinical trial of Face2Name. With the exception of patients with significant confusion, delirium, or dementia, all patients newly admitted to the general internal medicine (GIM) department were eligible for inclusion. All patients who met the inclusion criteria and provided informed consent were randomized for participation in one of three study arms: Group A, the control group, would not receive any intervention (the handout), as per current hospital practice; Group B would receive a handout with the names and roles of their clinical care team (Figure 2); and Group C would receive a handout which, in addition to the names and roles, displayed also the photographs of the members of their clinical care team (Figure 3). Patients who received handouts were encouraged to use them as often as desired during their hospital stay. Prior to discharge participating patients were given a standardized survey to test their memory recall of their clinical team and to evaluate their overall perception of the quality of communication with their clinicians.

Fig. 2: Group B Example Handout
Fig. 3: Group C Example Handout

Data Collection

The research team created a structured survey instrument designed to evaluate patients' knowledge of the names and roles of their hospital care team as well as to assess patients' satisfaction with the level and quality of patient-clinician communication. Questions were derived from a review of literature, through team discussions, and were based on the Hospital Care Quality Information from the Consumer Perspective (HCAHPS) Survey (HCAHPS 2013), the validated national standard for collecting or publicly reporting patients' perspectives. The survey tool was pilot-tested on twelve patients to evaluate whether the questions were clear, easy to follow, and allowed for honest response. The surveys were filled in by the patients or, if the patient required physical assistance, by either a present family member or the researcher.

At the first interim point of analysis, after approximately ninety patients had completed the trial, the research team realized that additional useful qualitative data could be gathered and analyzed

from the comments patients often shared during the researchers' visits. The protocol was amended to allow for researchers to pose and record patients' responses to several open-ended questions addressing their impressions of the intervention tool and comfort in sharing their own photos with clinicians. The data collected from these open-ended questions posed to ninety-two inpatients was analyzed and is reported in this paper. There was no limitation by group assignment as to which patients were interviewed; the research team simply gathered feedback from those patients who were willing to respond to additional interview questions or those who wanted to share their thoughts and impressions with the research team.

Qualitative data was gathered from patients in the following ways: first, the patient was asked a series of open-ended questions developed by the research team based on their experience and feedback throughout the first half of the clinical trial. Second, if the patient offered unsolicited remarks regarding the intervention or communication in the hospital that was not outside the scope of the study, utterances were also transcribed verbatim and coded. Questions posed by the researcher were tailored to patient group assignment; however, due to the consent process for participating in the clinical trial, all patients were somewhat familiar with the different intervention tool possibilities (i.e., handout just with names or handout with names and photos).

Interview questions posed to patients were intentionally open-ended in order to elicit as much feedback as possible from patients who might already be fatigued from participating in the clinical trial. The majority of questions were asked similarly to the following: "What do you think of this project?" (referring to the Face2Name handout initiative), "Do you prefer to receive photos or names, and can you please tell me why?" "Can you describe a scenario in which this would be useful" "What do you think of giving clinicians photos of patients?" A probe reflecting on their experience receiving photos of staff followed this. Dependent on context and the receptiveness of the patients, some patients were asked additional questions, while others may not have been asked all of the above questions. Additionally, it was often the case that the first question generated enough discussion to cover the remaining topics and that no additional questions needed to be

posed by the researcher. Therefore, data coded and reported in this paper were drawn from explicit responses to interview questions, and the result of spontaneous utterances shared by the patient.

Additional Data Collected from Clinicians

Data Collection—Hospital clinicians. Additional purposive interviews were conducted with five staff clinicians at the hospital. Participants were selected as unique cases either because they indicated particular enthusiasm toward the project, or reluctance to participate in the clinical trial.

Data Collection—Outpatient clinical staff. Finally, two more interviews were conducted: one with a physician and one with a registered nurse, at an outpatient clinic that requests that patients have their photos taken and stored in their files. The purpose of these interviews was to get a more in-depth understanding of the advantages of having photographs as memory aids, and to understand the feelings and concerns associated with sharing personal information such as photographs.

Data Analysis

Once patient participants in the Face2Name trial completed their surveys, a member of the research team entered the data into a database; quantitative data was then exported and analyzed using SPSS. Qualitative commentary given by patients and their family members was also recorded and input into the database. Together with these observations, data collected from interviews were transcribed and imported into NVivo for inductive analysis. In the grounded theory tradition (Charmaz 2003), transcripts were read iteratively and were analyzed for emergent themes, as well as for the themes identified in the analysis of the clinical trial data (e.g., patients' ability to recall clinicians, patients' ability to understand what clinicians tell them, and patients' perception of clinicians' ability to listen to them). Both open coding—identification of primary themes—and axial coding—analysis of relationships among themes—were conducted. Emergent themes were revised and refined through the constant comparison of instances from the data set.

Findings from Three Data Sources

From the analysis of ninety-two patients' and seven clinicians' feedback we identified the following five themes where respondents' statements could be placed: (1) the need for clinician photos, (2) the need for patients photos, (3) uses for the Face2Name tool, (4) improvements of the Face2Name tool, and (5) attitudes towards sharing of personal information. Described in greater detail in the paragraphs that follow, our findings suggest that patients and clinicians believe that receiving photographic aids can improve communication, and that both groups are more willing to share their personal information than was expected based on previous literature.

The Need for Clinician Photos

Issues raised by patients mirrored the existing literature that describe problems associated with the nature of large teaching hospitals and the lack of communication skills on the part of the clinicians. The most frequent criticism was the lack of personal introductions by the staff. Patients complained that clinicians would barge into their rooms, about five physicians or students at a time, both intimidating and overwhelming the patient with names to remember. More than one patient expressed dissatisfaction with physicians coming while they were sleeping, abruptly waking them up, and expecting patients to retain information quickly communicated to them while they were still half asleep.

Patients reported that they would have preferred to "see" the information (names, photos, etc.) because, for example, they were hard of hearing, while others mentioned that seeing the names helps as there are many international clinicians with unusual names that might be difficult to pronounce or remember had they not seen the spelling of these names. Table 1 provides the most common issues raised by patients and sample patient quotes for each issue.

Table 1

Issue	Patient quotation
Teaching hospital environment	"Communication is a big issue—especially in big places with students and residents going back and forth for healthcare."
	"If there was only one doctor, it would be easier to remember, but because this is a teaching hospital with teams, this [the handout intervention] definitely helps patients remember/ recognize each team member."
	"Doctors, they come five at a time and it's hard to remember."
Lack of introductions	"No one introduces themselves"
	"They [doctors] don't always introduce themselves—there was this one med student who didn't…"
	"Doctors sometimes come when I'm asleep, then when doctors introduce themselves I'm still half asleep…"
Difficulty with names	"Very useful—lots of international people—I'm good with faces, and this is useful for remembering names—I want to call people by their names."
Physical restrictions	"Difficult for me to communicate because I have difficulty hearing."
Memory	*Pt starts crying,* "It's my fault, but I don't know any of them…I only remember the people I saw today."

Also related to clinicians' photographs and names, a number of patients brought up the existence of hospital ID cards (badges). Most comments were criticizing the badges for being too small, the information on them difficult to see, or flashed by physicians too quickly to make any sense of them. One patient recalled, *"Dr. XXXX quickly flashed me her ID card but I was too far away to see. There was no purpose to that, if you wanted to show me your card come closer and*

give me time to look at it." One clinician, however, argued that the purpose of the ID badges is not to serve as identifiers for patients, but rather requested for security reasons within the hospital to ensure people in the hospital are not accessing information and locations without the necessary privileges.

The inability to recognize clinicians did not manifest with patients only. Although not the focus of the clinical trial, from our interviews with clinicians we found that they, too, have difficulty identifying their colleagues, even the members on their own teams. A number of nurses claimed they don't know whom to contact when a patient needs assistance because they don't know which physicians belong to what teams. Nurses were perpetually asking the same question of physicians on the ward: *"Are you on Team X?"* in the effort to track down physicians for medical approvals, or because they were being called to talk with patients and their families. One physician retold what happened during the "morning rounds" (meetings that take place every morning with the entire team discussing the status of each patient) when he needed the team's social worker to complete some forms so that the patient could be discharged. He got frustrated because he didn't see the social worker in the room; he complained: *"Social Work isn't even here!"* But then a person from the other side of the table responded, *"Yes, I am! I am Social Work,"* and the physician responded, embarrassed, *"Oh! Are you new? I don't even know you!"*

The need for clinicians' photographs to be used by other clinicians was expressed repeatedly during the Face2Name trial. Many attending physicians requested copies of their respective team's handout with photos, in order to become more familiar with the allied health members. One third-year medical student said: *"I want to get a copy of the team's handout because it would be useful in learning the names of the various allied health professionals on my team, specifically first names. This would allow me to avoid referring to members of the team by their profession 'the OT,' and lead to a more cordial work environment."*

The Need for Patient Photos

Findings from interviews revealed that there is also a need for patient photos. One clinician recalled an incident from the morning

rounds. The head nurse stated: *"'Patient A' is still on 6E."* And another resident responded: *"'Patient A' is still on 6E?! Then whose vitals was I taking this morning?"* Although taking vitals might not appear to be detrimental, "wrong patient" errors can have severe consequences; one patient recalled his personal experience:

> *Yeah, it's a good idea [providing photos of patients to clinicians], so doctors don't do something to you that is meant for another patient. One night people came in and started moving my bed. They didn't say anything. I asked them to check if I was the right patient. My IV line got jammed between the door and bed while they were moving me, and it got ripped out and had to be replaced. Turned out it was the patient beside me who was needing the room transfer, not me. Please take my photo! I would want it clipped to my curtains so that I don't get mistaken for another patient again.*

While the need for patients' photos mostly came from the clinicians' perspective, there was an interesting example coming from a patient, whereby they were describing how he sends his own photo along with thank you notes to his clinicians (after discharge), so that the clinicians can recall who the patient was: *"I write letters to doctors to thank them and I always include my picture at the end of the letter to help doctors know who I am."*

In spite of the large numbers of patients satisfied with receiving clinicians' photographs, and who believed that the handout intervention was successful in improving recall and communication, most patients remained skeptical when asked about sharing their similar information with hospital clinicians. Patients stated that they did not believe physicians would use such a tool, because they thought clinicians do not have time, have too many patients, and are not concerned with these issues. One patient summarizes all three points: *"Doctors won't be interested. I know because my father was a doctor. Plus doctors see so many patients with so little time."*

A few patients, however, agreed that their photographs could be beneficial to clinicians.

Table 2 provides examples of patients' quotes, with "con" and "pro" reasons for clinicians having patient photos.

Table 2

Reasons Con	**Patient Quotation**
Not enough time	"Don't know if docs have the time to remember…they're so busy with their duties."
	"Giving doc pictures will increase time wasted!"
Too many patients	"They see hundreds of patients a day."
Not a concern	"Meh, doctors have everything already…"
	"Patients have the time to look at these handouts—doctors wouldn't be too interested."
	"But patients want to know who their doctors are—doctors don't need to know their patient's face."
	"Don't see how pics help doctors. They don't see patients that often and it wouldn't make doctors come see patients more often."
Reasons Pro	**Patient Quotation**
Various reasons	"Useful on both sides."
	"Sounds like a good idea, helps when doctors have lots of patients."
	"Good idea, I want my picture right on the patient chart records."
	"Giving pics to doctors might be a good idea, there are many doctors and they see hundreds of patient a day, may be very difficult to recognize patients…usually doctors only recognize patients when referring to the chart."
	"Sure, why not!"

On the other hand, all the clinicians interviewed favored the idea of receiving patients' photographs stating that without them, they remember very little about the patients. When speaking with a physician from an outpatient clinic (where taking photos for patient files is the current protocol), he said: *"Some patients refuse to*

take pictures, and I hate that because when I look at a chart I remember nothing…I don't know who you are!" when I see a photo—BAM!…It's not just medication and treatment, I remember your personal history."

The registered nurse who works at the same clinic also mentioned the benefits of quick recall of patients, by comparing it to her previous clinics:

> *She [the patient without a photo] called and, ugh, I have no idea what she's taking about. Like, it just, it's automatic click. It's amazing how it [a photo] really does work. Saying that 'cause I'm, uhh, I've worked different offices, this isn't the first office I've worked in and, it's just, it's amazing how it really does work.*

She goes on to describe how she relates better to patients when she has access to their photographs:

> *Yeah, I absolutely. Definitely, I mean here, I wouldn't say more emotional cause you're taught to keep your emotions on in check. Feel empathy, not sympathy. But you definitely can relate more to the patient when you have a visual. 'Cause you remember so much more about them. 'Cause when a patient comes in and she's upset, she's crying, she's scared. She's whatever and every time (claps palm to front of hand to emphasize) you look at that picture, you remember that first time. It's just, you do feel like a connection.*

Uses for the Face2Name Tool

Some of the most surprising findings came from patients describing how they would use the information (photographs) provided with the tool. In addition to helping to get in touch with clinicians, six patients cited common courtesy as their reason for reviewing the handout with clinicians' names and photographs. Several patients mentioned the desire to refer to individuals by their name, and also keep clinicians' names recorded in order to thank them later. Patients expressed that they would feel more comfortable knowing who may walk into their room, and one patient explicitly mentioned having a list of individuals who have the right to enter

his room for security reasons also relating to property theft. Table 3 provides sample quotes from patients addressing the different uses of the handout.

Table 3

Use	Patient Quotation
Courtesy	"Yes, it'll be useful for remembering doctors… my memory is really bad after chemo, with this I know who is involved and able to refer to a person and not just 'that doctor.'"
For thanking	"Yes, I just want to know who has helped me. I wish to thank these people [point to page two of the survey displaying the clinicians] and handout is useful for recognizing them. I write letters to doctors to thank them and I always include my picture at the end of the letter to help doctors know who I am."
To keep a record	"I'll keep it → reference for the future → 'for the record' → plus it has the names and photos."
Track clinicians down	Pictures help—good for follow-up questions—know who to ask these questions
	"Great idea—I believe this is a project 'overdue'—I need this to track down doctors—I'm very frustrated how no doctors are seeing us—I can use these names to find them."
Comfort	"It's good to put a name to the face—makes things more comfortable for the patient—[a study] well worth doing—all patients should have one at their bed."
Souvenir	"I want to keep the handout—because I'm curious about these things and plus I want to keep it as a souvenir."
Understand clinician roles	"I'll take it home—not for the names, but because I like reading about the description of the roles on the back side."
Security	"Every patient should be getting a list of faces and names…from doctors to security guards." [later mentions nurses, janitors, etc]

Improvements for the Intervention Tool

Patients were broadly asked what they thought about the intervention. Of the patients who provided feedback, the majority, 86%, found the intervention very useful and supported the claim that photographs rather than names helped them to better remember and relate to their physicians. Of those patients that brought up the efficacy of memory aids, 63% preferred receiving photographs instead of just the names. As one patient said, *"First time I looked at the names, I couldn't connect with any of them."* 22% of patients preferred to receive names, mostly because they could see how to spell, and therefore pronounce, clinicians' names properly. Two patients mentioned needing both pieces of information equally; one said, *"The names or the pictures alone are relatively useless."* Finally, one patient mentioned that it was clinicians' accents and scrub "style" (colors and patterns of clothing) that is most memorable because this gives clinicians personal character that is easier to relate to. Table 4 highlights some quotes praising the tool and specifically the efficacy of photos as memory aids.

Table 4

Issue	Patient Quotation
Praise for the tool	"Great idea—this is 'Project Overdue.'"
	"Tremendous idea, it makes wonderful sense… You should pass [the idea] onto XXX East General Hospital."
	"This [*holding handout*] is what you need to do—this is the answer."
	"A study well worth doing. All patients should have one [handout] at their bed."
	"Very good idea, I looked at it before and after being visited by doctors."
	"I looked at it over 10 times!"

Photos as memory aids	"I would prefer to have the names and the pictures. Once you associate the face to the name, it's easy to remember your doctors."
	"Stays fresher in your mind because you can relate to a picture."
	"Good idea. If I see a picture of a doctor at least I would remember [him]."
	"Oh now I can recognize everyone because of the pictures."
	Pt in Group B receiving handout with ONLY names: "This was better than nothing, but photographs would be best."
	"If the names were useful, then the photos were very, very useful."
	"Easier to trigger memory."
	"Names—meh, not as useful as faces."
	"Photos are more useful—they are the most useful."

Even of those patients who did not find the intervention "useful," (of which there were only four), one wanted to keep their handout even after they completed the study in order to *"look at their faces when I have nothing to do."* Reasons cited for not finding the information useful were related to patients' feelings that the clinicians listed on the handout visit them so seldom; therefore it was pointless to get to know them. One patient noted, *"The handout was not really helpful—so many pictures of people that you don't see, or see very briefly—I see them once and that's it."* A number of patients indicated that a better use of the handout would be the inclusion of the pictures and names of their nurses with whom they had the most interaction. Patients suggested that it would be better if the handout would only provide information regarding the clinicians directly responsible for their care and who were most likely to visit them. "*I want a smaller handout with less pictures—only those that see me a lot,"* recommended one patient; another said, *"Highlight the resident assigned to me on the paper."* Another suggestion raised by patients was to keep the photographs of clinicians up to

date in order to reflect clinicians' current appearance. The most frequently repeated suggestion, however, was to include also nurses' information alongside other clinicians. This was often followed by commentary on how patients mostly dealt with nurses anyway, and that nurses themselves seemed to have communication breakdowns with other clinicians. A number of patients stated that they felt nurses were intimidated to call on physicians.

A couple of patients suggested having more personal information available: *"I suggest to add personal info beside the doctor's photos—like life goals, what med school, experiences…I mean like interesting things about the person, not their birthdate or address…"* (which, in fact, is similar to the information provided on the biosketch card in the Vanderbilt study mentioned earlier). Finally, one patient asked that clinicians point out who they are (which photo is theirs on the handout) when they introduce themselves.

Feelings Regarding Sharing of Personal Information

Patient perspective. Patients were asked how they would feel if requested to provide their own photographs to hospital staff (such as their care team) in the efforts to achieve improved recall, better communication and reduce the "wrong patient" errors. Of all respondents to this question, only 15% were opposed to sharing their information, while the rest either strongly supported the idea or were willing to share the information if it resulted in better patient outcomes.

Of the group of patients who said they would refuse to provide their photographs to clinicians, the majority cited (1) privacy concerns, and (2) aesthetics (the desire to look good in the photos) as motives for not consenting. There were also a number of patients who claimed they would not feel comfortable with sharing their photos without further elaborating on their reasons. Despite having the same concerns as the ones who refused, a group of patients stated they would be willing to share their pictures under some conditions that they listed. For example, although both groups cited privacy concerns, some patients said they would be willing to provide the information if it was guaranteed to only be circulated through the hospital network and kept secure. Similarly, both groups of patients referred to not looking "presentable" as a hesitation to providing

photographs, but the latter group stated they would provide photos *"as long as I have my makeup on."* Among patients willing to provide their pictures, some also mentioned pain as an additional factor influencing their decision to share; they said that if they are in pain, they don't feel like they *"want to help anyone"* and so they should be approached for this at appropriate times. Figure 4 highlights some examples of patient quotes from both groups—those refusing to share information and those willing.

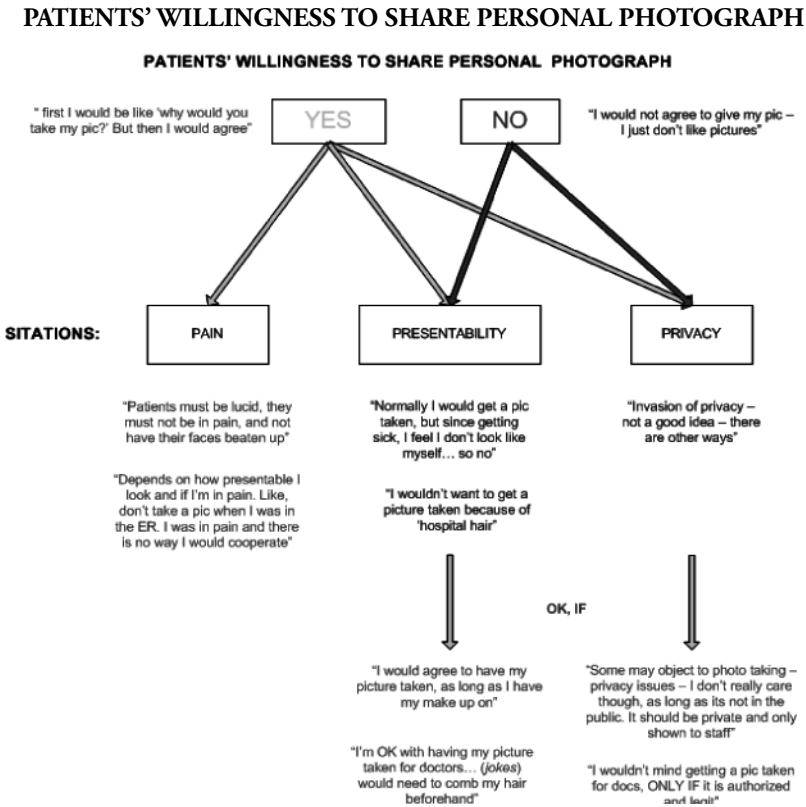

Fig. 4: Example quotes from patients willing and refusing to share photo

Clinician perspective. All but one clinician agreed to have their pictures taken by the researcher during the Face2Name study, to be printed on the handout and shared with patients. The clinician who refused to share their photo on the handout was later interviewed and asked about the reasons for not consenting. He responded:

> *My concern for not providing my photo to patients is based on security concerns. I think there is a risk that a photo may end up on the Internet or used for other inappropriate means, and would be a violation of staff privacy. We do work with people who may either have negative experiences at the hospital or make disturbing comments to staff and I feel staff security needs to be respected. I feel the vast majority of staff would oppose this policy for concern for their own security. There is no reason for a person to need to go "online" to view staff. These databases can be compromised and then photos could be accessed inappropriately. Face-to-face interaction is sufficient for other staff to get to know who you are.*

In a separate discussion regarding having personal information on their ID badges, one clinician argued that it is acceptable to have their information on the ID card because it's is not to serve as identifiers for patients, but rather for security reasons within the hospital ensuring clinicians are not accessing information and locations without the necessary privileges. He said:

> *Having your photo on a badge as a means of identification is appropriate to ensure the badge belongs to the correct person and acceptable because the photo is not given out to the general public. There is no reason why a staff members' photo needs to be generally accessible to the public. We need to balance staff safety and security with the need for patients to know staff members.*

Discussion

One of the most important outcomes from this study is the general agreement that there exists a problem with clinician anonymity within hospitals, negatively affecting communication, and justifying the need for the proposed intervention. Our interviews confirm

that a large number of patients cannot identify their clinicians, and also that clinicians sometimes misidentify their patients. From the firsthand accounts described above, it is clear that the majority of patients would use photographs to help them remember their clinicians, which has a positive impact on patient satisfaction and patient-clinician communication. Likewise, clinicians expressed the benefits of having photos of their patients; how it helps them both remember and better relate to their patients. Patients' impressions regarding clinicians' need for patients photographs however appear displaced, which can ultimately affect their willingness to provide this useful information. If patients think that clinicians do not have the time or the interest in reviewing their photos, then they will not see a point in consenting to provide this information, possibly contributing to a diminished quality of care.

The interviews also uncovered that clinicians have difficulties identifying their colleagues. Clinicians in administrative roles, such as the Chief Medical Resident, were constantly requesting updated copies of handouts with photos with the incoming medical students in order to get to know them better. Due to not being familiar with their colleagues' names, clinicians often refer to others (and even themselves) by their role titles (OT, PT, SW) instead of their names. Better knowledge by staff about their colleagues, for example being familiar with each other by name, is consequential for achieving high levels of respect and trust, resulting in better teamwork (Zwarenstein et al. 2007). Lack of familiarity among staff also leads to workflow inefficiencies, with time spent trying to locate responsible clinicians on the ward.

These findings justify the need to develop an intervention; based on the dynamic nature of a teaching hospital environment (with daily changing assignments of medical staff to patients, on varying shifts and rotations) and the feedback received during this study, the only sustainable solution would be a tool embedded within the hospital HIT system.

Quantitative results from the clinical trial, which are reported in detail elsewhere, found that the Face2Name intervention is effective; there is high statistical correlation between patients receiving photos of their clinicians (Group C) and increased clinician recall when compared to those patients just receiving names (Group B) or no intervention tool at all, the control group

(Group A). Additionally, responses from the standardized survey reveal that most patients prefer photos to names as a memory aid. This finding is also supported by the qualitative feedback, with both patients and clinicians stating that visuals tend to help trigger their memory. However, it quickly became apparent that, regardless of the intervention's success, some practical obstacles might impact the hospital-wide acceptance and sustainability of the tool.

Early in the study, some participants raised concerns regarding sharing their personal information. Hesitations mentioned by patients both willing and not willing to share their personal information often overlapped. Privacy concerns were raised by a few patients; however, most said they would still agree to share personal photos if their information was kept secure and would only be seen by clinicians. One clinician was strongly opposed to sharing his personal information, citing security reasons and the ability to inappropriately use his photo elsewhere (i.e., online.) However, the data indicates that most patients used the information as a resource for remembering and addressing clinicians while they were in the hospital. Very few patients expressed interest in keeping the information past their hospital stay, stating that the information would be obsolete and useless because if they are re-admitted it would likely be to a different ward assigned to different clinicians. Although there was only one clinician throughout the study who refused to share his information, his concerns are legitimate and worthy of future research in order to confirm that he is, in fact, an outlier and does not represent a common stance. The second most common hesitation raised by patients addressed their presentability. This, too, can be mitigated if patients have their photos taken when they feel comfortable doing so, or alternatively the system could upload an existing photo that the patient provides.

In conclusion, our qualitative findings suggest that patients and clinicians believe that receiving photographic aids can improve communication, workflow, and ultimately, the quality of care. Patients were not as concerned with sharing their personal information (photographs) with clinicians via hospital HIT systems, as previous literature had warned, as long as the information is taken at appropriate times, accessed by the appropriate people, and kept secure. In fact, many patients were surprised that such ubiquitous electronic systems were not already in place, while

others mentioned that they had conceded to the times, and would be willing to have their photos available online if it meant improved patient outcomes. Given that the hesitations raised by patients can be resolved in a number of ways (some of which were brought up by the patients themselves), we argue that sharing such information should become protocol in the future as it shows to have a clear beneficial impact on the quality of care.

References

Agency for Healthcare Research and Quality Healthcare. "Use of Photographs as Second Means of Identifying Patients on Psychiatry Units Virtually Eliminates Medication Errors Related to Misidentification." Study, *Innovations Exchange. MD.,* 2012. http://www.innovations.ahrq.gov/content.aspx?id=2626.

Amalberti, René, Yves Auroy, Don Berwick, and Paul Barach. "Five System Barriers to Achieving Ultrasafe Health Care." *Annals of Internal Medicine* 142, no. 9 (2005): 756–64.

Appari, Ajit, and M. Eric Johnson. "Information security and privacy in healthcare: current state of research." *International Journal of Internet and Enterprise Management* 6, no. 4 (2010): 279–314.

Baker, G. Ross, Peter G. Norton, Virginia Flintoft, Régis Blais, Adalsteinn Brown, Jafna Cox, Ed Etchells et al. "The Canadian Adverse Events Study: The Incidence of Adverse Events Among Hospital Patients in Canada." *Canadian Medical Association Journal* 170, no. 11 (2004): 1678–86.

Brennan, Troyen A., Lucian L. Leape, Nan M. Laird, Liesi Hebert, A. Russell Localio, Ann G. Lawthers, Joseph P. Newhouse, Paul C. Weiler, and Howard H. Hiatt. "Incidence of Adverse Events and Negligence in Hospitalized Patients: Results of the Harvard Medical Practice Study I." *New England Journal of Medicine* 324, no. 6 (1991): 370–76.

———, Atul Gawande, Eric Thomas, and David Studdert. "Accidental Deaths, Saved Lives, and Improved Quality." *New England Journal of Medicine* 353, no. 13 (2005): 1405.

Charmaz, Kathy. "Grounded Theory." *Strategies of Qualitative Inquiry* 2 (2003): 249.

Coiera, Enrico. "When Conversation is Better than Computation." *Journal of the American Medical Informatics Association* 7, no. 3 (2000): 277–86.

Glenberg, Arthur M., and Thomas Grimes. "Memory and Faces: Pictures Help You Remember Who Said What." *Personality and Social Psychology Bulletin* 21, no. 3 (1995): 196–206.

Hasebrook, Joachim P., and Markus Gremm. "Multimedia for Vocational Guidance: Effects of Individualized Testing, Videos, and Photography on Acceptance and Recall." *Journal of Educational Multimedia and Hypermedia* 8, no. 4 (1999): 377–400.

Centers for Medicare & Medicaid Services, Baltimore, MD. "Hospital Care Quality Information from the Consumer Perspective (HCAHPS)." Research report, HCAHPS, 2012. http://www.hcahpsonline.org/files/HCAHPS%20V8.0%20Appendix%20A%20-%20HCAHPS%20Mail%20Survey%20Materials%20(English)%20March%202013.pdf.

Houts, Peter S., Cecilia C. Doak, Leonard G. Doak, and Matthew J. Loscalzo. "The Role of Pictures in Improving Health Communication: A Review of Research on Attention, Comprehension, Recall, and Adherence." *Patient Education and Counseling* 61, no. 2 (2006): 173–90.

Hyman, Daniel, Mariel Laire, Diane Redmond, and David W. Kaplan. "The Use of Patient Pictures and Verification Screens to Reduce Computerized Provider Order Entry Errors." *Pediatrics* 130, no. 1 (2012): e211–19.

Jackson, Jeffrey L., Judith Chamberlin, and Kurt Kroenke. "Predictors of Patient Satisfaction." *Social Science & Medicine* 52, no. 4 (2001): 609–20.

Joint Commission on Accreditation of Healthcare Organizations. "Root Causes of Sentinel Events." (2007)" Report, The Joint Commission, 2007.

Kargopoulos, Philip, Zoe Bablekou, Eleftheria Gonida, and Gregory Kiosseoglou. "Effects of Face and Name Presentation on Memory for Associated Verbal Descriptors." *The American Journal of Psychology* (2003): 415–30.

Leape, Lucian L., and Donald M. Berwick. "Five Years After to Err is Human." *JAMA: The Journal of the American Medical Association* 293, no. 19 (2005): 2384–90.

Morris, Brent. Vanderbilt University. Orthopaedic Patient Recognition of Attending Improves Satisfaction Evaluations (Orthopaedic PRAISE study/ ORTHOPRAISE) In: ClinicalTrials.gov [Internet]. Bethesda (MD): National Library of Medicine (US). 2000- [cited 2014 Feb 27]. Available from: clinicaltrials.gov/ct2/show/NCT01263639 NLM Identifier: NCT01263639

Mostashari, Farzad. "The Power of Electronic Health Records." Report, the US Department of Health & Human Services, 2012. http://www.youtube.com/watch?v=zg6wc-7Erds.

O'Leary, Kevin J., Nita Kulkarni, Matthew P. Landler, Jiyeon Jeon, Katherine J. Hahn, Katherine M. Englert, and Mark V. Williams. "Hospitalized Patients' Understanding of their Plan of

Care." *Mayo Clinic Proceedings* 85, no. 1 (2010): 47–52.

Patient Relations, Office of the Ombudsman. *Annual Report 2010/2011.* Annual report, University Health Network, Toronto, 2011. http://www.ombudsman.on.ca/Files/sitemedia/Documents/Resources/Reports/Annual/AR%202011-2012/Annual-Report-2011-2012-ENG.pdf.

Phipps, Etienne, Marian Turkel, Elizabeth R. Mackenzie, and Carlos Urrea. "He Thought the Lady in the Door Was the Lady in the Window: A Qualitative Study of Patient Identification Practices." *Joint Commission Journal on Quality and Patient Safety* 38, no. 3 (2012): 127–34.

Anonymous. "Poor communication is common cause of errors." *Healthcare Benchmarks. Quality Improvement* 1, no. 2 (August 2002): 18–9.

Scott, Craig R., Stephen A. Rains, and Muge Haseki. "13 Anonymous Communication: Unmasking Findings Across Fields." *Communication Yearbook* 35 (2011): 299.

Tentori, Mónica, Jesús Favela, and Victor M. González. "Quality of Privacy (QoP) for the Design of Ubiquitous Healthcare Applications." *J. UCS* 12, no. 3 (2006): 252–69.

Wu, Robert C., Kim Tran, Vivian Lo, Kevin J. O'Leary, Dante Morra, Sherman D. Quan, and Laure Perrier. "Effects of Clinical Communication Interventions in Hospitals: A Systematic Review of Information and Communication Technology Adoptions for Improved Communication between Clinicians." *International Journal of Medical Informatics* 81, no. 11 (2012): 723–32.

Wu, Shinyi, Basit Chaudhry, Jerome Wang, Margaret Maglione, Walter Mojica, Elizabeth Roth, Sally C. Morton, and Paul G. Shekelle. "Systematic Review: Impact of Health Information Technology on Quality, Efficiency, and Costs of Medical Care." *Annals of Internal Medicine* 144, no. 10 (2006): 742–52.

Zinn, C. "14,000 Preventable Deaths in Australian Hospitals." *BMJ (Clinical Research Ed.)* 310, no. 6993 (1995): 1487.

Zwarenstein, Merrick, Scott Reeves, Ann Russell, Chris Kenaszchuk, Lesley G. Conn, Karen-Lee Miller, Lorelei Lingard, and Kevin E. Thorpe. "Structuring Communication Relationships for Interprofessional Teamwork (SCRIPT): A Cluster Randomized Controlled Trial." *Trials* 8, no. 1 (2007): 23.

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11

Employers' Use of Online Reputation and Social Network Sites in Job Applicant Screening and Hiring

by

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Abstract

People's online reputation—the information available increasingly in public or semi-public online digital formats—affects their paid work. While much attention has been given to social network sites and online reputation in people's personal lives, our research focuses on their professional lives. Our research examines how employers and recruiters in the Netherlands use online reputation information in the job selection or hiring process.

Based on our analysis of interview data from human resource professionals and recruiters, we focus on three main findings: (1) the variability in the use of online reputation information in the hiring process, (2) the degree to which something ambiguously described by participants as "curiosity" drives this use, and (3) the unequivocal importance accorded to photographs of job applicants. We conclude by discussing implications of these findings for our study of online reputation, including both social network sites and social media in general.

Introduction

People's online reputation—the information available publicly or semi-publicly online about individuals, for example, via a search in Google, on a social network site (SNS), or through commercially available databases online—is starting to receive popular (Fertik and Thompson 2010) and scholarly attention (Chesire et al. 2010; de la Llama et al. 2012). While earlier empirical research on this topic—largely in the tradition of human-computer interaction (HCI)—focused primarily on issues of privacy (Acquisti and Gross 2006; Solove 2007) and reputation, recommender, or collaborative systems (Resnick et al. 2000; Dellarocas 2003; Jøsang et al. 2007), more recent scholarship is examining the importance of online reputation, what some have termed people's digital footprints (Madden et al. 2007), in their personal and professional lives. As information about individuals available online and digitally proliferates, online reputation has begun to play a crucial role in individuals' professional lives and, more specifically, in the screening and hiring process. Our research focuses on how employers and recruiters use online reputation information in the process of screening and hiring job applicants.

Background

People's Use of SNS and Online Reputation Information

Recent research provides us with robust knowledge about how people use information on social networking sites as well as, more generally, information found online. We know that people use the

information on SNS profiles, for example, to form impressions of others: the simple act of having completed specific profile fields on a Facebook profile page influences the number of friendship links on the site (Lampe et al. 2007). The impressions that people form online from thin slices of that information (e.g., condensed profiles) resemble those that they form offline from thin slices of behavioral information (Stecher and Counts 2008). People's judgments about other's social network site profiles rely more heavily on social cues provided by third parties (e.g., friends' posted comments) rather than on those provided by the profile owners (Walther et al. 2009). Maintaining online reputations by modifying privacy settings or choosing not to disclose information matters a great deal to some people, but others are largely unconcerned or ambivalent about them (Antin et al. 2011). And a wide span of motivations and gratifications drives people's use of a SNS such as Facebook (Joinson et al. 2007; Wohn et al. 2011).

In professional contexts, the pre-Internet boundary maintenance work between home and work (Nippert-Eng 1996; Gregg 2011) continues digitally as people continue to actively manage the boundaries between their work and non-work online reputations or across social network sites (DiMicco et al. 2007; Skeels et al. 2009; Vorvoreanu 2007). Within corporations, employees may use these sites for tasks such as connecting to other employees or campaigning for projects (DiMicco et al. 2008). And, as others have demonstrated, a host of challenges accompanies employees' use of social media, such as maintaining confidentiality of corporate knowledge in online contribution contexts wider than the corporation or traversing status hierarchies with the organization (Skeels et al. 2009).

The focus on professional use of online reputation information has thus far concentrated on use by employees of the company. Not only entertainers and politicians, but, increasingly, people with less public visibility also experience consequences of their personal SNS profiles. For the most part, the popular emphasis has been on the negative consequences of online reputations for current employees. In the United States in 2008, the National Labor Relations Board filed a complaint against a medical transportation company in Connecticut that fired an employee who had posted negative comments on her personal Facebook profile about her

boss. A car dealership in Canada terminated the contracts of two of its employees for "making damaging and derogatory comments on Facebook" (Lougheed v. UFCWIU 2010). A Swiss insurance company dismissed an employee when it learned she had been active on Facebook during a period in which she had been granted leave from work because of an inability to use a computer (Thomasson 2009).

Online Reputation & the Hiring Process

The often thick, descriptive content in individual profiles on social network sites—once intended solely for non-work relationships—has become useful and important in professional contexts, specifically in the screening and hiring process. Despite the trend of using information available online about people in professional contexts, very little scholarly research has thus far examined how information available online is used in employee recruitment and applications. Industry research reports provide the strongest indication that employers are using such information found through search engines and on various SNS profiles to screen applicants. A January 2010 study of 275 recruiters and 330 consumers conducted for Microsoft Research by Cross-Tab, for example, found that 70% of US recruiters had rejected applicants based on information they found online and 85% of them indicated that positive online reputation influences their hiring decisions. The study showed that while the overall percentages were lower in the United Kingdom and Germany, they followed the same trend, which suggests that increasing importance of online reputation in hiring decisions. Another 2009 survey by CareerBuilder.com ("SNS and Work") of 2,600 hiring managers indicated that 45% of employers were using social network sites to research job applicants.

While online reputation is clearly playing a growing part in the hiring process and some industry commentators have suggested that this information can be used positively in the job hiring process (Coutu 2007; Slovensky and Ross 2012), it remains to be shown which aspects of online reputation matter. Industry research provides some insight into what elements of job applicants' online reputation affect employers' decision-making process. According to the human resource professionals surveyed by Cross-Tab in the 2010 report, the top five reasons for rejecting applicants based on

online reputation were, in order, concerns about the applicant's lifestyle; inappropriate comments and text written by the applicant; unsuitable photos, videos and information; inappropriate comments or text written by family and relatives; and comments criticizing previous employers, coworkers, or clients. The most common reasons discovered in CareerBuilder.com's 2009 study echoed these results: inappropriate photographs or information, content related to applicant's use of alcohol or drugs, bad-mouthing previous employers or coworkers, and poor communication skills.

The scholarly literature that directly addresses how employers use SNS and online information to screen job applicants is comprised of a handful of studies. The US-based scholarly articles predictably focus on the legality of using such information, with a particular eye to the potential for discriminatory or unethical behavior (Tenenbaum 2012; Slovensky and Ross, 2012; Clark and Roberts 2010; Byrnside 2007–8). In her dissertation research, Berkelaar (2010) found that human resource professionals' (personnel, recruiters, employment lawyers, and hiring managers) use of technologies influenced how they evaluated job applications and that the technology "offered a way to verify skill claims, to evaluate character or ethics, and to provide evidence of motivational capital or passion for a position, organization, or profession" (p. 16). De la Llama et al.'s (2012) research suggests that employers' use of Facebook in hiring processes reveals assumptions about potential job applicants' personal and professional lives. In addition, two studies of college students demonstrated that students were able to use SNS profile data to assess accurately some individuals' personality traits (Kluemper and Rosen 2009) and that students rated job applicants with family-oriented or professional-oriented SNS profiles higher than those who had alcohol-oriented SNS profiles (Bohnert and Ross 2010). This lack of empirical research only emphasizes the need for a better understanding of how people use online reputation information in employee recruitment and applications for professional purposes.

Method and Data

The research presented herein is the pilot study of a larger ongoing research project about how recruiters and human resource professionals use online reputational information, including social

network profiles, in their hiring processes. Given that so little empirical data on the topic exists, the pilot study was exploratory by necessity, and we present trajectories for future research rather than findings that should be generalized widely.

Interviews & Interview Participants

Qualitative interviews were conducted in the Netherlands in 2009–10. The Netherlands, with an estimated 16.5 million residents in 2010 is, according to Eurostat.ec in their "Europeans and Internet" report, one of the most "wired" countries in the world, based on the number of broadband connections per resident (38.5 per 100 in 2010). The country's most popular social network site, Hyves.nl, reported in 2011 that they had approximately nine million Dutch users in the middle of that year; with, according to comScore.com in an April 26, 2011, report on their website, 7.6 million unique visitors in March 2011. This is followed closely by Facebook, which had 6.5 visitors in the same month. ComScore.com also reported that the Netherlands ranks first worldwide in penetration for both Twitter and LinkedIn.

For this pilot study, the third author interviewed eleven participants (five women and six men) in the Netherlands. All interviews were conducted in Dutch, which is the native language of all of the participants and the interviewer. Participants were selected to represent variation in geography, urbanity, industry, and company size. The participants represent companies such as a large multinational brewery, an Internet marketing agency, a national engineering consultancy, and the local office of worldwide temporary employment agency. Participants—typically gatekeepers who culled applicant pools rather than final decision-makers—were recruited at a career event and then contacted via email to arrange interviews at their offices.

Data Analysis

All interviews, which ranged from thirty to sixty minutes, were audio-recorded and transcribed by the interviewer. Using the interview transcripts, the first author developed a coding scheme based on them, in line with a grounded theory approach

(Glaser and Strauss 1967). Participants were randomly assigned a representative number for the purpose of quoting in this paper. All of the quotes provided herein were translated into English by both the first and second authors, who are bilingual in Dutch and English—one is a native English speaker and the other a native Dutch speaker.

From a method perspective, it is also worth explicitly underlining a few elements about the context of Netherlands and its formal labor laws and informal labor practices. First, use of labor market intermediaries, such as headhunting and recruitment firms for permanent position at all levels, is commonplace so our participants who are not employed in-house at companies still play a key role in hiring practices. Second, personal information about applicants that is illegal to disclose in other countries (such as the United States) is routinely provided. For example, the norm in Dutch CVs is to include personal information such as the applicant's marital status, age, number of children, and, occasionally, a photograph. Third, the interview data revealed a level of transparency and candor about factors in hiring considerations on the part of human resources professionals and recruiters that is in marked contrast to the kinds of data that such professionals working in more litigious and discrimination-focused countries—like the United States—might provide.

Given the small sample size of this research, in no way do we expect this data to be representative of or generalize the hiring process in the Netherlands. Nevertheless, we do expect it to provide useful descriptive data that will suggest trajectories for future research on this topic by us, as well as others.

Findings

Our research findings reveal the variations in how human resource professionals use online reputation, the prominence of what participants termed "curiosity" as a motivation for its use, and the significance of visual forms of online reputation information—namely, photographs.

Use of Online Reputation Information

First, our data indicates the complexity of how employers and recruiters use online reputation information. Not a single participant indicated that she or he consistently consulted online reputation information in the applicant screening process. Instead, the nature of employment vacancies and their prospective targets, the veracity and reliability of online reputation information, and the stage of hiring process figured greatly in decisions about whether to use this material.

Nature of Employment Vacancy Matters

Participants indicated that online reputation information was of little use when employment vacancies were targeted at older employees or positions that did not involve office work. For example, a HR representative at an energy company indicated that, in her experience, the target population for many of the vacancies she is trying to fill—people between the ages of thirty and forty-five with mechanical experience—does not use social network sites. A senior consultant at a recruitment and placement agency also focused on the nature of vacancies when explaining why his office did not use online reputation information: *"It's because, I think that we deal with a lower segment, so it doesn't matter how people look, they only must—don't get me wrong—must only do dumb work with their hands and 'that's it'"* (P8). Participants also indicated that they used online reputation information for job vacancies with particular qualities, such as ones that would rely on having a broad network of professional contexts or were forward- or customer-facing. A director at an online marketing agency explained that he expected to find online reputation information on applicants for some kinds of vacancies. *"What's funny is also if someone doesn't have Hyves or LinkedIn and then you actually think, wow, he has no Hyves or LinkedIn, how strange, you're applying to an Internet marketer"* (P1). For an account manager position, for example, a participant explained that he would expect to see the potential applicant to have many connections on LinkedIn.

Questionable Veracity and Reliability of Information Online

A human resource professional at an international engineering consultancy attributed his lack of reliance on online reputation information to the time it would take to verify information for the high volume of applicants:

> *I personally don't because it takes a lot of time and I don't know what is true—you have to then check in the interview what is true. So, yes, then you invest the time to look up someone on Google or Hyves, then you have to read everything and then you still have to bring them in for an interview…I'm not saying that you might not learn something extra from social networking [sites], but up until now we haven't really missed much.* (P6)

Similarly, explaining her caution in relying too much on this information, a human resource consultant at an energy provider said:

> *So I find it always risky with Google that you do not always know whether you have the right person. And then, I think, if a friend or someone else has ever put something nasty about you on the Internet, you also find that, so I am always a bit afraid of the truthfulness of what you find because everyone can post information naturally.* (P7)

Participants were also clearly aware that the information they find online might not be trustworthy and that they might not get full or complete information, if, for example, job applicants had restricted access to their SNS profiles. They were also conscious that the information posted on those profiles, in particular, was not entirely under the control of the profile owner. A recruiter at an insurance company, for example, indicated that based on his own use of SNS, he was aware that other people could influence your profile and perhaps do damage.

Relevant to Some Stages in the Screening Process

Participants did not seek online reputation information throughout the screening and hiring process. For the most part, they indicated that they simply did not have the time to look up on the Internet every applicant for a position, particularly when they received hundreds of applications. Rather, HR professionals used their standard methods of winnowing the applicant pool and only then might they use the information.

A few participants also indicated that they weaved online reputation information into their initial telephone interviews or in face-to-face screening of potential applicants. They did not always, however, disclose the source to the job applicant. This use of asymmetric information for interpersonal gain has also been documented in studies of Facebook (Hancock et al. 2008). One human resource professional, for example, brought up material about work activities he had seen on an applicant's LinkedIn profile as an item in the interview. Another person asked an interviewee directly about an image she had seen on an applicant's site: *"I do mention it in the job interview, then I'll say 'Goh, you did have a nice photo,' or, she was a rather small girl and she stood there next to a huge wheel of a Hummer and then I said something like 'Was that your car?'"* (P2).

Looking out of Curiosity

Second, rather than seeking online reputation information as a form of cross-checking facts or verifying set criteria, all of the participants indicated that when they sought this information they did so, in their words, mainly out of curiosity *(nieuwsgierigheid)* or to get a general sense of the applicant. Repeatedly, when probed about what they sought or expected to learn, participants responded as did a senior consultant at a recruitment agency: *"Actually nothing in particular, but it is nice to take a look….Well, we look only at the photos and in that instance how someone looks and you can get something from the rest of the photos. But it is more curiosity than we will do anything real with it*" (P8).Another participant emphasized that the search for online reputation information was superficial: *"Look, in the end, you will make an appointment based on the CV and*

you'll look at it for what someone does. I should say, for younger people, I have looked to see what people have done on Hyves to keep it in mind, but nothing deep" (P5).

The director at a marketing agency also explained his motivation to look at SNS profiles of applicants or use Google to search for information about them as something light, for the sake of curiosity: *"When I am not directly involved [in the hire] within our company then it is especially curiosity. When I am involved then it is curiosity, and I also just want to see the interests of the people and what they have done already to get an image [of them]"* (P1).

Participants also tended to describe their motivations to seek online reputation information in terms of getting a feeling or a sense of the applicant in a holistic, overall way. For example, when asked when he would actively seek online reputation information, one participant responded: *"Yes, that's very difficult, I wouldn't know, it's purely by feel. If I have the idea the letter is somehow a bit exaggerated or there is no clear line in it. This work is also a bit by feel, by using your gut feeling, not logical reasoning"* (P5). Similarly, a human resource employee at an IT solutions company emphasized the importance of getting an overall sense of the person: *"To get a feeling of the person behind the CV because anyone can, for example, make a very good or a very bad one, but be completely different and we are interested in the person that is coming here to work, we are looking for those capabilities. Anyone can learn how to write a CV"* (P2).

Some participants indicated that online reputation information gave them a sense of applicant's professionalism. For instance, one participant explained how the photograph and SNS profile presentation could communicate a suitable level of professionalism: *"And we looked through her CV and often I check whether they are on LinkedIn or Hyves. Sometimes only for a photo or how you present yourself on the site. Are you aware of the fact that people other than your friends, classmates or family can look at this data?"* (P2). When asked directly whether he uses online information into account for the first interview, a participant argued for the significance of fleeting, first impressions: *"What was that study again, that within three, four seconds you have an impression of someone. Not with regard to capabilities of someone because you did not had the interview yet, but you do form an impression of someone. And during the interview it will become clear if someone is the right person for the job. There*

are exceptions, but usually I think that the first impression is a rather good one, just like when you are in the café" (P1). A few participants, particularly those who were older or did not have SNS profiles, described a sense of discomfort with using online reputation information in the screening and hiring process. A manager in a local municipality office indicated that he felt people's personal lives should not be taken into account in the hiring process, implying that the information about applicants available online was personal.

Importance of Photographs of Applicants

Participants, even those that did not regularly seek online reputation information, agreed that, for better or for worse, images of job applicants influenced the screening and hiring process. They sometimes directly addressed the question of whether an applicant's attractiveness or other demographic characteristics (e.g., age or gender) influenced the process, but more often cloaked this concern in rhetoric about the suitability of applicants for particular positions.

One participant indicated that he looked at different aspects of SNS profiles, depending on the service. For example, when looking at LinkedIn (a site intended to be a professional network) he examines potential applicants' background, work experience, and photo. However, he emphasized the importance of the applicant's photograph on Hyves.nl profiles: *"I only click on the photo and that is enough for me. No, because well, there is so much information which is not interesting, well, the only thing you can get from there is which kind of music someone likes or if someone likes to travel, but nine out of ten times you have to go through the whole profile before you find that. So it is just looking at the photo"* (P4). Several participants remarked that visual online reputation information was important for positions that were customer-facing or representative of the company in other ways. A senior consultant at a recruiting agency indicated that he used this information to screen at a previous job where they placed customer-facing employees: *"And then we used Hyves more because you want someone who is representative and if you get a CV in then you don't know how someone looks and then you will go see if someone is representative. What is easiest is to check on*

Hyves before making an appointment…a receptionist or a telephone operation must look groomed.... Look, if someone is a woman with a beard, then that, of course, can't be, but, yes, you see what I mean" (P8).

Visual online reputation information provided not only direct feedback on the appearance of applicants, but also about the kind of choices they presented about themselves or about their lives in the photographs displayed. A few participants indicated that they expected to assess applicants' level of professionalism and discretion based, in part, on images: *"If someone has strange pictures or weird background layouts then you do click away quicker, you will not invite the person then…if someone has, for example, naked women on the background or skulls then you are inclined to click away, even though the person does has the right education and does fit the job profile"* (P6).

Participants were clearly aware of the possibility of images and appearance influencing the screening process. However, none of them admitted, for example, that the perceived attractiveness of an applicant influences their own decisions. The participant from the recruiting agency acknowledged that photographs were probably influencing other human resource professionals' decisions. *"There are also enough companies out there who do use the photos in that way and think, 'She seems like a nice-looking lady, let's invite her'"* (P4). But most respondents volunteered, as did this participant, without prompting, that they did not factor applicants' attractiveness into their process. *"So, I don't think, 'Now, that's a good-looking man, I'm going to give him an appointment.' No, unfortunately, not"* (P6).

When participants explicitly acknowledged that photographs could provide demographic information about job applicants that might influence the screening process, they discussed it often in a way that portrayed some discomfort and caution. Responding to a question about the role of photographs of applicants in the hiring process and drawing a comparison to the practice of using photographs on CVs, an executive for a brewery commented: *"Now, you know, I've been in HR for a while and in my early years we had offices that would also send a photograph, but I would have preferred they didn't"* (P9). When asked why he would prefer that they had not provided a photograph, the participant answered: *"It brings a kind of mindset, it gives you…well, it is difficult to form an impression*

independently when there's a photo. I'd rather not have it. You're automatically influenced by it…You're going to make an association, it can be positive, it can be negative" (P9). Other participants similarly acknowledged the risks of online photographs about prospective applicants. *"I think that there's something very dangerous about photos. Even though people know that they can not make selections based on them, I think that a lot of people unconsciously, they do that secretively"* (P8). Another participant also warned about the danger of images online: *"In principle everything that comes walking into the door, and that's the same in a bar, it gets scanned. And in this way it is also getting scanned and it can be different, but images in people's minds are hard to erase and I think that it is just not smart, with these kind of media you should be careful"* (P4). Interestingly, one participant saw the emphasis on visual online reputation information as a way to circumvent the bias that might come from other aspects of applicants' background. *"You often hear that people above fifty it is hard to find a job, even though as a secretary and as a receptionist they still look very representative. Thus, with those kind of functions I can imagine that you will add a photo…what I am saying, if men and women want a representative function and they are a bit older, which makes it harder to get a job—which is of course ridiculous— then I can imagine that they add a picture"* (P6).

Discussion

Our analysis points to several factors that influence whether or not human resource professionals seek this information in the first place. Online reputation information may influence hiring for specific kinds of positions, which may not map onto traditional distinctions of white-, blue-, or pink-collar or office versus non-office. Rather, the degree to which a position is perceived as customer-facing or visually representing the company or its reliance on manifest social networks might be of greater import.

Participants clearly indicated that what they garnered from online reputation information could, in no way, serve as a substitute for their own expertise and experience in the process of assessing and screening new potential job applicants. They did not in any way perceive their role in the process as being supplanted by the

availability of online reputation information. For example, those professionals who relied on SNS profiles or information from Google in their screening processes did so at the latter stages. By this point, they had already sorted and discarded the majority of applications, using the same methods they have always used.

Since human resource professionals saw themselves as the ultimate interpreters of information about applicants, they were also sanguine about the nature of online reputation information. They were aware that the data available on an SNS profile or through Google might be inaccurate, misleading, confusing, and incomplete and clearly saw the information as a tool in their already established process.

Our findings also speak to the existing work on online identity management in social media and impression management on social network sites. Earlier research on personal use of Facebook or MySpace, for example, has emphasized the expressive—though, of course, managed and curated—quality of these profiles. The premium that participants placed on wanting to see professionalism on SNS profiles suggests that curating one's social media use is very important under certain circumstances for securing employment. The ambivalence that many, in the US at least (Antin et al. 2011; Madden et al. 2007; see also Cross-Tab's 2010 report), feel about their online reputation might decrease if the consequences of negative or positive online reputations could be more accurately assessed and proven.

The issue of privacy or formal discrimination arose very seldom in our data. While no doubt shaped partly by the fact that the participants resided in a EU country governed by its own set of rules and expectations around privacy, it is still noteworthy how few participants explicitly mentioned concerns about the appropriateness of seeking and finding information that prospective job applicants did not directly give them. While a few indicated that they respected the fact what they learned about prospective applicants' activities in their non-professional lives should not affect their professional lives, they showed no concern or remorse, much less fear of legal repercussion, about seeking or finding this kind of information. The only real hint of concern about formal discrimination of bias appeared in people's discomfort about the power of photographs to influence the screening process.

Two findings from our data appear particularly provocative not only for our understanding of how online reputation matters in the screening and hiring process, but also for our understanding of how social media and other Internet-related technologies are shaping work practices. First, the emphasis on curiosity as a motivation for seeking online reputation information merits further investigation. Berkelaar (2010) also found in her study about cyber-vetting of that participants mentioned curiosity as a motivation to seek online reputation information. In our study, participants not only repeatedly emphasized curiosity but, even more importantly, when they did so they seemed unable to clearly articulate the source of their curiosity and what they thought or expected would satisfy it. Being able to determine the nature of curiosity in this context would serve well the use and design of social media.

Second, the import of photographs—visual online reputation information—cannot be exaggerated. Often participants' concern with curiosity revolved around photographs of the potential job applicant. While applicants' demographic characteristics, such as age, attractiveness of gender-appropriate appearance arose in the analysis, more often than not participants expressed that seeing a photograph of a participant on an SNS profile, for example, provided them with useful information to make decisions and to give them a feeling or a sense of the applicant. Yet this characterization is less than precise. Certainly, previous research in a number of fields has established well how criteria, most notably attractiveness, influences people's evaluation and impressions of others. Still, we need to investigate more precisely participants' preoccupation with visual online reputation information, and not solely through the lens of discrimination and bias.

Conclusion

Our preliminary research provides a starting point from which to investigate how human resource professionals use online reputation information to screen and hire job applicants. Our findings document the variability in the human resource professionals' use of online reputation information, the emphasis placed on curiosity as a motivation, and the significance of photographs. Companies are using online reputation information in their screening

and hiring processes, and yet, we are just beginning to analyze the implications of using this information means for people's professional lives. Future research needs to examine how human resource professionals mobilize online reputation in their already complex and subjective work practices.

References

Acquisti, Alessandro, and Ralph Gross. "Imagined Communities: Awareness, Information Sharing, and Privacy on the Facebook." *Privacy Enhancing Technologies: Lecture Notes in Computer Science* 4258 (2006): 36–58.

Antin, Judd, Elizabeth F. Churchill, and Bee-Chung Chen. "Workshop on Online Reputation: Context, Privacy, and Reputation Management." In *Proceedings of the 20th International Conference Companion on World Wide Web*, edited by Sadagopan Srinivasan, Krithi Ramamrithan, Arun Kumar, M. P. Ravindra, Elisa Bertino, and Ravi Kumar, 321–2. New York: ACM, 2011.

Berkelaar, Brenda L. "Cyber-Vetting: Exploring the Implications of Online Information for Career Capital and Human Capital Decisions." PhD diss., Northeastern University, 2010.

Bohnert, Daniel, and William H. Ross. "The Influence of Social Networking Web Sites on the Evaluation of Job Candidates." *CyberPsychology, Behavior & Social Networking* 13, no. 3 (2010): 341–7.

Byrnside, Ian. "Six Clicks of Separation: The Legal Ramifications of Employers Using Social Networking Sites to Research Applicants." *Vanderbilt Journal of Entertainment & Technology Law* 10 (2008)*:* 445–77.

Chesire, Coye, Judd Antin, and Elizabeth Churchill. "Behaviors, Adverse Events, and Dispositions: An Empirical Study of Online Discretion and Information Control." *Journal of the American Society for Information Science and Technology* 61, no. 7 (July 2010): 1487–1501.

Clark, Leigh A., and Sherry J. Roberts. "Employer's Use of Social Networking Sites: A Socially Irresponsible Practice." *Journal of Business Ethics* 95, no. 4 (September 2010): 507–25.

Coutu, Diane. "We Googled You." *Harvard Business Review* (June 2007): 37–47.

De la Lama, Vanessa, Isabel Trueba, Carola Voges, Claudia Barreto, and David J. Park. "At Face(book) Value: Uses of Facebook in Hiring Processes and the Role of Identity in Social Networks." *International Journal of Work Innovation* 1, no. 1 (2012): 114–36.

Dellarocas, Chrysanthos. "The Digitization of Word-of-Mouth:

Promise and Challenges of Online Feedback Mechanisms." Working Paper 4296-03, MIT Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA, March 2003. http://18.7.29.232/bitstream/handle/1721.1/7346/4296-03.pdf?sequence=1.

DiMicco, Joan Morris, and David R. Millen. "Identity Management: Multiple Presentations of Self in Facebook." In *Proceedings of the 2007 International ACM Conference on Supporting Group Work*, 383–6. New York: ACM, 2007.———, David R. Millen, Werner Geyer, Casey Dugan, Beth Brownholtz, and Michael Muller. "Motivations for Social Networking at Work." In *Proceedings of the 2008 ACM Conference on Computer Supported Cooperative Work*, 711–20. New York: ACM, 2008.

Fertik, Michael, and David Thompson. *Wild West 2.0: How to Protect and Restore Your*

Reputation on the Untamed Social Frontier. New York: AMACOM, 2010.

Glaser, Barney G., and Anselm L. Strauss. *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Chicago: Aldine, 1967.

Gregg, Melissa, Work's Intimacy. Polity, 2011.

Hancock, Jeffrey T., Catalina L. Toma, and Kate Fenner. "I Know Something You Don't: The Use of Asymmetric Personal Information for Interpersonal Advantage." In *Proceedings of the 2008 ACM International Conference Computer Supported Cooperative Work*, 413–6. New York: ACM, 2008.

Joinson, Adam N. "Looking At, Looking Up or Keeping Up with People?: Motives and Use of Facebook." In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1027–36. New York, ACM, 2008.

Jøsang, Audun, Roslan Ismail, and Colin Boyd. "A Survey of Trust and Reputation Systems for Online Service Provision." *Decision Support Systems* 43, no. 2 (2007): 618–44.

Kluemper, Donald H., and Peter A. Rosen. "Future Employment Selection Methods: Evaluating Social Networking Web Sites." *Journal of Managerial Psychology* 24, no. 6 (2009): 567–80.

Lampe, Cliff A. C., Nicole Ellison, and Charles Steinfeld. "A Familiar Face(book): Profile Elements as Signals in an Online So-

cial Network." In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 435–44. New York: ACM, 2007.

Lougheed Imports Ltd. (West Coast Mazda) v. United Food and Commercial Workers

International Union, Local 1518, 2010 CanLII 62482 (BC LRB), <http://canlii.ca/t/2d49w>.

Madden, Mary, and Aaron Smith. "Reputation Management and Social Media: How People Monitor their Identity and Search for Others Online." Internet report, Pew Internet & American Life Project, 2010. [Au: only "Madden 2007" is in text.]

———, Susannah Fox, Aaron Smith, and Jessica Vitak. "Digital Footprints." Internet report, Pew Internet & American Life Project, 2007.

Nippert-Eng, Christena E. *Home and Work: Negotiating Boundaries through Everyday Life*. Chicago: University of Chicago, 1996.

Resnick, Paul, Richard Zeckhauser, Eric Friedman, and Ko Kubawara. "Reputation Systems: Facilitating Trust in Internet Interactions." *Communications of the ACM* 43, no. 12 (2000): 45–8.

Skeels, Meredith M., and Jonathan Grudin. "When Social Networks Cross Boundaries: A Case Study of Workplace Use of Facebook and LinkedIn." In *Proceedings of the ACM 2009 International Conference on Supporting Group Work*, 95–104. New York: ACM, 2009.Slovensky, Ross, and William H. Ross. "Should Human Resources Managers Use Social Media to Screen Job Applicants? Managerial and Legal Issues in the USA." *info* 14, no. 1 (2012): 55–69.

Solove, Daniel J. *The Future of Reputation: Gossip, Rumor, and Privacy on the Internet*. New Haven, CT: Yale University Press, 2007.

Stecher, Kristin, and Scott Counts. "Thin Slices of Online Profile Attributes." *Association for the Advancement of Artificial Intelligence* (2008): 127–34.

Tenenbaum, Jason M. "Posting Yourself Out of a Posting: Using Social Networks to Screen Job Applicants in America and Germany." Working paper, Maurice A. Deane School of Law, Hofstra University, Hempstead, NY, 2012. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2020477.Thomasson, Emma. "Facebook Surfing while Sick Costs Swiss Woman Job." April 24, 2009. http://www.reuters.com/article/idUSTRE53N4JF20090424.

Vorvoreanu, Mihaela. "Managing Identity across Social Networks." In *Proceedings of the 2010 ACM Conference on Computer Supported Cooperative Work*, 481–2. New York: ACM, 2010.

Walther, Joseph B., Brandon Van Der Heide, Lauren M. Hamel, and Hillary C. Shulman. "Self-Generated versus Other-Generated Statements and Impressions in Computer-Mediate Communication: A Test of Warranting Theory using Facebook." *Communication Research* 36, no. 2 (2009): 229–53.

Wohn, Donghee Yvette, Cliff Lampe, Jessica Vitak, and Nicole B. Ellison. "Coordinating the Ordinary: Social Information Uses of Facebook by Adults." In *Proceedings of the 2011 iConference*, 340–7. New York: ACM, 2011.

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12

Occupying the Commons: A Practice for Citywide Resilience

by

Natalia Radywyl

Abstract

When New York City awoke on the morning of October 30, 2012, there was an unusual quiet. It was the morning after Hurricane Sandy, a storm not only devastating in its destruction of lives and livelihoods, but also for its enormous symbolic impact: it seemed to have defeated NYC, a city where networks are the daily currency and street vibrancy the lifeblood, so easily. Yet this also became a test-bed for new forms of grassroots innovation. In particular, Occupy Sandy—a cohort borne of the barely-year-old Occupy movement—became a notable force in rapidly mobilizing to offer citywide support. They appeared to work as a distinctive community of practice, integrating street-level and online experience to bolster soft infrastructure through the creation of "urban commons."

Now, more than a year and a half after Sandy, deeper exploration of the policy measures which harness grassroots strengths have been slow to transpire, despite "resilience" becoming the darling term in much of the political discourse. In this study I use Occupy Sandy as a lens to examine a model for urban resilience through

the interplay between sustainability, community mobilization, and technological innovation. I draw upon ethnographic fieldwork (June 2012–March 2013) to map Occupy's evolution in NYC, identifying the dynamics and practices which laid the framework for Occupy Sandy-related activities, and to raise a series of policy considerations about supporting soft infrastructure through urban commons practices. These issues must be taken seriously if we want to build significant inroads into making our urban environments more sustainable.

Prologue

When New York City awoke on the morning of October 30, 2012, there was an unusual quiet, its usual metropolitan rhythms barely perceptible. Roads lay damp and still. The subway remained dormant in subterranean slumber. The skies, peacefully blue, were plane-free, calm, once more given to the birds. I had evacuated my low-lying south Brooklyn home to take refuge in a friend's north Brooklyn apartment, and in this neighborhood it was the trees that bore remnants of the previous evening's violence: many were rendered unseasonably naked, standing exhausted; some broken and others slain, wrenched roots entangled in pulled slabs of sidewalk concrete. As daybreak passed small handfuls of city-dwellers ventured into the streets, picking through Hurricane Sandy's residue as dogs, finally freed from their long enclosure, tore around parks. Yet for me, the greatest new silence was my phone's. Nightfall's steady stream of Facebook and Twitter status updates along with text messages had quieted as neighborhood by neighborhood, friends lost power, cell batteries died, and the few functioning network towers jammed. The ninety-mile-per-hour winds and a four-to-eight-foot mini tsunami which battered NYC claimed forty-eight deaths, swept away whole blocks of Staten Island, left Lower Manhattan without power while parts of Coney Island, the Rockaways, and Brooklyn faced a heartbreaking, flooded chaos. It was America's second most expensive storm, with damage to NYC estimated at $19 billion (Blake et al. 2013).

While other cities around the world certainly have—and do—fare much worse in the face of climate events, "Superstorm" Sandy had an enormous symbolic impact because of the fact it so easily

defeated NYC, a city where networks are the daily currency and street vibrancy the lifeblood. NYC's infrastructure, which could only be described as "stretched" at the best of times, was now simply broken. While the preemptive closure of services such as public transit, schools, and the Stock Exchange had ground the city to a halt, it was, perhaps, the post-disaster rupturing of information networks which best revealed the inherent vulnerability of the fabric in which New Yorkers had been so tightly woven: the expectation of ubiquitous communications. This became evident as I spent that first morning trying to contact my silent Manhattan friends. Sporadically, they found temporary access to localized power sources—battery strips supplied by an Al Jazeera van, bike-powered generators in the East Village, or trekking into the uptown grid by foot. With their appearance came a common plea, as expressed in one friend's text message: "I'm fine, dk [don't know] what's going on tho, who to ask/where to go? Cld you just tell me where to find info?" Clearly, former Mayor Bloomberg's website updates and Tweets were not the best way to reach the people who needed this information the most.

While the city administration began deploying large-scale, ground-relief efforts—mobilizing the police, sanitation departments, and 4,000 members of the National Guard, and liaising with the Federal Emergency Management Authority (FEMA) and the Red Cross—unsupported needs seemed to scale exponentially. Hard infrastructure was troublesome to resurrect. With ports closed, the city rapidly fell into gas shortage and supply distribution crises, and the fractured communications infrastructure bore the legacy of poorly regulated cellular networks. While short-staffed utilities companies struggled to repair damage to the electricity grid, emergency workers were unable to communicate with first respondents (Klinenberg 2013). As hours of need turned to days, then weeks of despair, it was hardly surprising that these agencies began to face mounting public criticism that their response simply was not adequate (Feuer 2012).

Arguably, it was the soft infrastructure mobilized by communities and grassroots organizations that began to bridge these gaps. In particular, one new group quickly attracted attention for its ability to marshal citywide relief with more agility than state agencies. Within weeks this group, known as Occupy Sandy (OS)—a

cohort borne of the barely-year-old Occupy Wall Street (OWS) movement—was delivering 5,000 hot meals per day around the city. It soon came to attract thousands of volunteers daily to its relief hubs and began steadily accumulating online donations and inventory worth millions of dollars, all the while driving a public awareness campaign deeply critical of the systematic inequity brought to light by the harsh reality of a climate disaster. OS seemed to stand apart from other organizations in its combined breadth and deep reach of mobilization by bridging on and offline relief strategies—particularly important in areas without power. They appeared to bolster soft infrastructure as a community of practice, something many larger agencies were struggling to do.

Now, more than a year and a half after Sandy, the question of *when*, not *if*, there will be another disaster remains. Deeper exploration of the policy measures which harness grassroots strengths have been slow to transpire, despite "resilience" becoming the darling term in much of the political discourse. It is in this context that I wish to enquire deeply into resilience to ask how our cities can become innovative platforms for improving the ability of our neighborhoods and communities to weather systemic volatilities—like climate change—and how distinctive social dynamics, technology usages, and street-level experience may influence innovation. I specifically draw upon Mosimane and his colleagues' (2012) thematically similar study into resilience, which examines the dynamics of collective action which sustain common-pool resources. They view resilience as both an approach to analyzing change in a complex (social-ecological) system according to its "adaptive cycle" (Holling 1973), and a way to define a system property—the ability of a system to maintain its current configuration upon receiving internal and external shocks (Folke 2006). I therefore examine the interrelationship between sustainability, community, and technology through this interpretation of cities as complex, adaptive "systems within systems" (Alberti 2009), and use OS as a lens for identifying examples of social and technological activity which acted as "leverage points" (Meadows 1999) to promote greater systemic resilience. A socio-technical systems perspective is also useful for identifying the key elements which enabled the word "occupation" to become more than a verb, but also a discrete practice. Shove and Walker's "dynamics of social practice"

framework (2010) accounts for systemic change by proposing that "social practices are not merely 'sites' of interaction but are, instead, ordering and orchestrating entities in their own right" (2010, 471). I use this perspective to evaluate Occupy's evolution in NYC, with attention to the particular dynamics and practices that laid the framework for OS-related activities.

Drawing upon ethnographic observation, case studies, interviews, and my own embedded experiences working with some affinity groups (June 2012–March 2013), I commence with Occupy's nascent days, tracing its rapid evolution from meme to occupation, suggesting that this burst of online and street-level activity seeded practices which would lay the framework for efforts following Sandy; in essence, through the making of an "urban commons." In doing so I present a theoretical diegesis to define an urban commons in more detail, and how it comes to be cultivated by "communities of practice"—essential to the making of soft infrastructure and OWS's ability to scale rapidly into the decentralized network which became known as the Occupy movement. Returning to Occupy Sandy, I detail how these decentralized networks rapidly evolved into a distributed system of emergency relief, a model which promises much opportunity for improving cities' resilience. I conclude by raising a series of policy and governance considerations about supporting soft infrastructure through urban commons practices, issues that must be taken seriously if to make significant inroads into making our urban environments more sustainable.

From Meme to Movement

On September 17, 2011, around a thousand people gathered in a small, wind-swept plaza in downtown Manhattan for an NYC General Assembly meeting. The group was comprised of activists sporting a range of affinities, causes, and concerns; yet as an informal collective, all shared a growing realization that the many grievances they had been protesting had a common source: the global financial system, and symbolically, its beating heart was Wall Street. Three hundred stayed to camp, little knowing that for some, Zuccotti Park would become home for almost two months and the basecamp to a global change movement. This reappropriation of

a privately-owned public space in NYC rendered the contestation of civic space a symptom of a much greater cause: the unjust appropriation of common resources by a corporate few—"the 1%." However, online platforms, particularly social media, were vital in circulating ideas and growing affinity in the months leading to this street-level direct action. Prior to this physical occupation of city space, one of the world's largest privately-owned public spaces, Facebook, became an ad hoc forum for experiments in deliberative democracy, hosting new Occupy meme-related groups and profiles, waxing and waning according to "likes" and user comments (Massey and Snyder 2012b).

Over recent years this combined use of public space and online media have proven powerful tools for grassroots mobilization. Like the tens of thousands who had also demonstrated against systemic marginalization throughout 2011 (from the Wisconsin State Capitol in Madison to Pearl Square, Bahrain, the Plaça de Catalunya, Barcelona, and Tahrir Square, Cairo), OWS's collective action highlighted the role of public space as an inclusive "leveler" (Oldenburg 2010), acting as a conduit for social change (Hobsbawm 1973). Yet Occupy stands apart from the 2011 protests by virtue of its rapid scaling from meme to global movement. Multiple conflating factors aided this process, including NYC's status as a global finance and media hub, the grassroots groups already discussing an encampment in the "belly of the beast" (Wedes 2013), and media-jamming, anti-consumerist foundation Adbusters generating a viral meme and global media campaign to "occupy" Wall Street (Schwartz, 2011), fueled by #occupywallstreet, one of thousands of Occupy-related hashtags which would power a social media swarm beyond comparison (Massey and Snyder 2012b).

Figure 2. Adbusters' campaign (Image by Adbusters, 2011.)

While Zuccotti Park became OWS's base as a place of encampment and demonstration, by early October it resembled a shantytown. The occupation required strategies which would reinforce the encampment's resilience, from supporting ongoing political activities and communications, to contending with the environmental realities of camping in downtown Manhattan while ensuring the occupation was a safe and inclusive environment—a test, given that the occupiers comprised hundreds of disparate strangers. As OWS organizer Justin Wedes fondly recalls, it became "an innovator's dream lab" (2013), with organically forming working groups adaptively co-coordinating the occupation's longer-term sustainability. Internal governance was inspired by the anarchist-devised, consensus-based system, which had become a practiced convention following the NYCGA's preoccupation planning meetings months earlier. On-site communication was aided by the "people's microphone," a system which overcame the

ban on amplified sound by having assembled crowds echoing a speaker's words in unison. Basic environmental design ensured that agency-style tents were situated to take logical advantage of landscaping (Schwartz 2011), including the Kitchen (with free meals), the People's Library (with free books), Comfort (free personal items), Sanitation (comprising of a grey water system, recycling, and cleaning), Medical, a flexible multi-use space, sleeping and social zones, Media Outreach, Infotents and art areas throughout, and the General Assembly meeting place beneath the iconic and visually prominent *Joie de Vivre* (fig. 4). Being "off the grid" meant that six gas-fed generators (which were removed by the fire department in late October and replaced by two bike-powered generators) and solar electricity powered the entire site. Street-level partnerships were also important, with sympathetic, neighboring businesses allowing bathroom use, nearby food carts welcoming the spike in business (Massey and Snyder 2012a), and even residents offering space to those struggling with the autumnal cold.

Figure 4. Joie de Vivre in Zuccotti Park. (Photo by Natalia Radywyl, 2011.)

While off the power grid, occupiers were plugging into communications networks to mobilize information, with the Media Working Group coordinating independent media streams and street presses to counter the narrow view presented by major news channels. A number of open-source websites were launched

to help serve increasingly complex administrative needs, such as nycga.net, a platform for maintaining working groups' notes and schedules. Conceived and launched within only ten days, it had attracted a million page views, 9,000 registered users, and one hundred working groups after only three weeks, revealing how effective digital platforms can be when designed with user experience and existing needs in mind (Suarez 2013). As hundreds of encampments replicated OWS across the US, interoccupy.org was launched (also in October) as a service for coordinating conference calls between occupation sites. Existing social networking platforms like Facebook and Twitter remained popular, as well as Occupy Together, a Meetup group which broke world records by simultaneously hosting 2,996 communities (Meetup 2013; fig. 6). Offline efforts were also important for furthering communications campaigning, from the keepsake T-shirts and bags produced by the newly formed Screenprinters Guild, to the visual identity spearheaded by NYC-based art collective Not An Alternative (NAA), which designed the caution tape-style banners, armbands, and badges Occupy has become recognized by (fig. 7).

Figure 6. Occupy's global Meetup group (screenshot).

Figure 7. Occupy's visual identity. (NAA, 2011.)

Therefore, from its earliest days, the Occupy movement evolved from an innovative interplay between street-level and online activity in a reproducible manner which allowed it to scale: by mid-October rallies had been held in Tokyo, Sydney, Madrid, and London, and encampments were present in almost every major American city. Nearly all were modeled on the NYCGA, with rotating facilitators rather than leaders, and evading a fixed set of demands. Yet OWS also took influence from others. Massey and Snyder describe Zuccotti Park as an offline analogue of a Wikipage, a "wikicamp" founded upon open-source urbanism drawing local and international influence through its related networks. "Moving between the physical and the virtual, participants navigated a hypercity built of granite and asphalt, algorithms and information, appropriating its platforms and creating new structures within it… Occupiers tested the parameters of this multiply mediated world" (2012b).

The occupation ended November 15, 2011, following a court ruling that changed the park's terms of use and rendered the encampment illegal. Yet by then, many of the street-level and online activities that had emerged during the occupation had moved beyond mere gestation, with seeds spread around the world and practices consolidating in NYC which would drive Occupy throughout its first year, and eventually support the waves of innovation which emerged following Sandy. It is now these practices to which we shall turn, to understand the social and technological relations which can drive iterative processes to drive scalable systemic impact.

Occupation as Practice: An Urban Commons

Shove and Walker offer a framework that describes how niche practices emerge to become the "provisional" beginnings

of an iterative, open-ended reproductive process, and eventually consolidate to create broader impact (2010, 475). Their holistic "materialized theory of practice" avoids the bifurcating influence of technological and cultural determinism by proposing that innovation be understood by analyzing how social practices emerge according to an active combination of three horizontally circulating, interdependent, and mutually shaping elements—the "ingredients" of practice: materials (things, technologies, tangible physical entities), competences (encompassing skill, know-how, technique), and meanings (symbolic meanings, ideas, inspiration) (Shove et al. 2012a). In the case of OWS, occupation became a practice comprising materials such as public space, technology, branding, and media artifacts; competences in sustaining the encampment, consensus procedures, direct action, and knowledge of legal rights—all the while bonded in shared values, the meaning of social justice, open source ethics, equity, and the empowerment of the 99%. Yet, importantly, it is the occupiers themselves as "centers of 'doing'" which become the conduits of practices and are active in the process of transforming practices by virtue of rearranging or breaking the elements' relationship to each other (Shove et al. 2012a, 41). It is in this sense that niche practices evolve through performance, and evolve into "practice as entities" by becoming entrenched through repetition and reproduction.

Yet importantly, it was the open-entry, collective performance of these practices that helped to standardize and scale its activities into a coherent movement. Cultural anthropologist Etienne Wenger describes this as the formulation of "a community of practice," where informal participation helps generate a coherent internal architecture and sense of established membership with "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger et al. 2002a, 5). OWS's communities of practice are notably characterized by an architecture of collective, consensus-based participation processes aspiring towards open governance, supported by socially networked and open-source technology. These characteristics enabled the movement to rapidly scale and replicate, in the way it is predicated on "people forming loose connections quickly—something that modern technology excels at" (Schwartz 2011). Given the relative

ease with which encampments around the world consistently reproduced OWS-style communities of practice, we can see how fluidly these structural elements can come together and be valued as "a social structure that can assume responsibility for developing and sharing knowledge" (Wenger et al. 2002b, 20). In this way practices become the common "properties" of community in their sharing of a co-evolving, interdependent relationship (Wenger 1999, 45), yet strengthened by a sense of individual membership and identification, a perspective which dovetails with Shove's description of practitioners as conduits for practice.

In addition, the importance of the spatial context in which practices play out cannot be overstated. The lived reality of sustained co-location in downtown Manhattan clearly influenced the style of novel practices and distinctive collective identity that formed (Shove et al. 2012b, 124). For example, Wedes describes Zuccotti Park as "the rallying point, the spark…People from many different backgrounds and ideologies and viewpoints came together" (2013). It was copresence that allowed the collective recombination of practice elements and a meme to gather traction into a movement. This begs the question as to what made the practice of occupying Zuccotti Park distinctive and compelling enough to support an encampment for two months, and to form a strong enough internal sense of belonging and external identity to catalyze its reproduction around the world. One answer perhaps lies in the words of Daniel Latorre, an Occupy activist: "I've never felt anything like it, because there was a sense of openness, that's why you went there…There's something that goes on when people are next to each other. It felt very alive" (Latorre 2012). Other accounts similarly describe a communal spirit that drove and nourished the encampment's activities; the park became a thriving social and civic space with teach-in workshops, General Assembly meetings, meditation, guitar, drumming and yoga groups, a baroque music ensemble, and long discussions into the night. Clearly, it appears that the hyper-localization of elements created opportunity for community and self-identification to form. As noted by one commentator, "despite all the attention given to how Twitter, Facebook and livestream video have helped spread the word, the heart of the occupation is most definitely unplugged" (Kim 2011). Therefore, for Occupiers, social practices formed around

the common value of sustaining the encampment while motivated by the overarching political campaign of the 99%. They used agile, adaptive practices, aiming to restore a privately owned public space to public use, and resultantly developed communities of practices predicated upon principles of environmental sustainability, open governance, equal participation, open source communications, and an equitable sharing of resources.

I propose that this range of mutual activity underlies a more resilient approach to living in cities. Michel Bauwens similarly describes how a culture of collectivity becomes a "sharing platform"—a commons constituted through the social practices of a "community of contributors…co-constructing a common object of value" (Bauwens et al. 2012). From this perspective I describe what transpired in Zuccotti Park as an "urban commons," defined by the very distinctive integration of online and street-level practices that lie at the heart of OWS's practices. I propose that urban commons be understood as a framework for fostering sustainability within cities for, as writer and urbanist Jay Walljasper writes, "a commons arises whenever a given community decides it wishes to manage a resource in a collective manner, with special regard for equitable access, use and sustainability" (2010). Therefore, a study of the communities of practice which cultivate urban commons can shed light on the requisite behaviors, cultures, and institutions consistent with equitable and transparent sharing of resources (Cash et al. 2006; Marshall 2008) and more sustainable ways of living. This, in turn, enables us to think pragmatically about how practices can be further propagated for, as Shove and Walker note, "focusing on practices, their trajectories and their interconnections, obliges us to attend to processes of ongoing transformation, feedback and related circuits of reproduction" (2010, 476).

Occupy: A Decentralized Network of Commons Practices

Just as the Occupiers' eviction highlighted the fragility and transience of newly formed urban commons within environments shaped by more powerful and rigid social, commercial, and institutional interests, its subsequent expansion into a values-based, rhizomatic, decentralized network of practice demonstrates a capacity for adaptation and resilience, locating leverage points

which compel greater systemic impact, especially through the use of urban commons elements.

For example, media working groups expanded to serve multi-scale, post-encampment needs. Interoccupy.net rapidly grew capacity to support an increasingly complex national communications network, with the ultimate aim of promoting "mobile communication technologies…[to] help virtual communities manifest in the streets" (interoccupy.net 2013). These practices reinforced the open-source politics native to many of Occupy's programmers and designers, such as occupy.net's provision of open-source software tools as a "part of the global information commons, maintained by communities, not corporations" (occupy.net 2013). On the ground, the vacuum left by the eviction became filled by a number of groups engaging P2P urbanism (Salingaros 2008), drawing upon Zuccotti Park's practices to create "pop-up" urban commons. For example, Occupy Town Square (OTS) supported communities in developing their own commons practices through town square events in parks. This was an outreach tactic reflecting the adaptive spirit, open participation, and mutual aid practices of OWS. As described by one member, it was "essentially event-planning with a pluralistic, civic engagement tilt, whereby parks would be activated for a day-long, hyper-local pop-up commons" (Latorre 2012).

Figure 8. OTS wayfinding (Photos by Natalia Radywyl.)

A further group staging pop-up commons was the team behind The Illuminator, "a spectacularization machine"; or, rather, a hacked minivan fitted with a 12,000-lumen projector, sound system, laptop, pop-out library, and facilities for making hot chocolate and lemonade (Goldmark 2012; fig. 9). For six months The Illuminator reappropriated NYC's streets four nights a week, projecting content along blank walls and culture-jamming signs and billboards. They stopped to create pop-up public spaces and information commons, talking to the public and handing out literature provided by the People's Library, yet all the while Tweeting and uploading the evening's events—media campaigning by "shining the light for the 99%" (The Illuminator 2012; fig. 10).

Figure 9. The Illuminator (Photo by Natalia Radywyl.)

Figure 10. The Illuminator's campaigns. (Photos by The Illuminator.)

These groups are but a small sample of the decentralized network of activity which reflect not only elements of Zuccotti Park's commons practices, but also the vulnerability of nascent communities of practice. While there had been campaign "wins" by Occupy's one-year anniversary (such as Occupy Our Homes, a coalition supporting communities facing foreclosure; the Debt Resistor's Manual, a self-education and step-by-step guide for

dealing with lenders; and the Rolling Jubilee, absolving $11.5 million in student loans), external and internal pressures were challenging the resilience of many communities of practice. While hostility from the city administration was an enduring concern, funding, resourcing, and maintaining membership were perhaps more troublesome, with affinity groups increasingly losing numbers due to burnout, lack of mentorship or "handover" practices, and trying to scale while being stretched thinly. It seems that system-changing leverage points have a lifespan, unless additional measures can be instituted to reinvigorate flagging energy.

There is a developmental pattern which describes how the resilience of communities of practice comes to be either undermined or supported. Mosimane et al. (2012) offer a convincing framework for understanding how groups of people can self-organize to sustain management of "common-pool resources," or commons, in the long term. By integrating collective identity and resilience theories, they analyze the dynamism of the collective identity which arises through the comanagement of commons. They propose that the stronger a collective action, the stronger the arising collective identity—a process influenced by the strength of the "identification" by which someone sees themselves as a member in the collective and the "affective commitment," or the degree of feeling emotionally attached to involvement and other members (Mosimane et al. 2012). Following Holling's 1973 account of the adaptive cycle in resilience theory, they argue that the group's resilience is enhanced through continuous, slow change, as it allows members to develop behavioral patterns consistent with a strengthening of collective identification (Mosimane et al. 2012, 355). Yet many of Occupy's affinity groups have been characterized by quick bursts of productive energy (often compelled by a direct action or protest), which then waned as practices began to consolidate. Clearly, mitigating strategies are needed to temper the weakening dynamics—perhaps an opportunity for further social media innovation to enhance affective commitment and identification between these bursts. As it turned out, it was the hurricane which reenergized practice activity, with the common value of supporting human need raising Occupy's capacity for agile adaptation and self-organization while also substantially growing a new volunteer base. As one organizer described, "There was a loss

of momentum...OS has been a rekindling of that momentum and feeding it back into the movement" (Nunez 2012).

Occupy Sandy: A Distributed System of Practices

For the Occupy network in NYC, OS became an arena for a rehearsing of practices, ultimately driving its evolution into a more resilient, distributed system of operation. At one level, their response was influenced by the latitude they were increasingly allowed following expanding public and institutional acceptance of their identity as a face for emergency relief (as compared to anarchist protest), while at another, stretched authorities simply had their hands full and were focusing attention elsewhere. With greater freedom to act upon instinct, the Occupy network moved strongly in pursuing its practices in aid of, as one affiliated tagline declared, "Restoring Power to the People." Yet even more significantly, Occupy underwent its greatest systemic shift since the eviction: the decentralized network of diverse affinity groups began to interconnect. Practices began to consolidate with each other, working increasingly in concert as a localized, networked, modular, and open system. These properties are the emergent characteristics of a "distributed system," a model for resilience by nature of its composition as "a web of flexible interdependence in which no single actor or supplier is vital" (Biggs et al. 2010, 11–12).

Occupy-related communities of practice proceeded to mobilize on and offline throughout NYC at an unprecedented pace and scale, despite little preparation. Two organizers had registered a Google Voice number and designated an inbox as a single go-to for information needs (Nunez 2012), and "Occupy Sandy" Facebook and Twitter accounts were registered in the hurricane's wake. However, as donations, volunteer offers, and on-the-ground demands began to amass it was clear that a formal system for "real time" on-the-ground assistance was necessary (Nammack 2012). Within weeks OS was coordinating efforts in every affected borough, made easier by the fact that, as Kristian Nammack (an OS coordinator) remarked, "There were pre-existing networks and relationships...a community there, there were already systems" (Nammack 2012). For example, priests in the interfaith network offered their churches *cart blanche* to organizers they'd come to know

over the year. These became hubs: communications, distribution and volunteer training centers, some recording the arrival of up to 2,000 volunteers per day. Stronger or new partnerships also formed between existing affinity groups, adapting practices to the emergency relief context, and reactivating or extending their grassroots partnerships. For example, The Illuminator was called upon to project information in areas without power, and OTS was requested to deploy an urban wayfinding system in the Rockaways, as coordinators needed to make their hubs visible to people without electricity, online access, or street-level knowledge. NAA's capacity to "brand" became important, distributing armbands (so that hub coordinators could be immediately recognized among volunteers) and vests (so that other agencies could identify them as a part of a coordinated relief effort), and making a hub wayfinding system contiguous with Occupy's symbolic identity, capable of furthering its political critique (fig. 11).

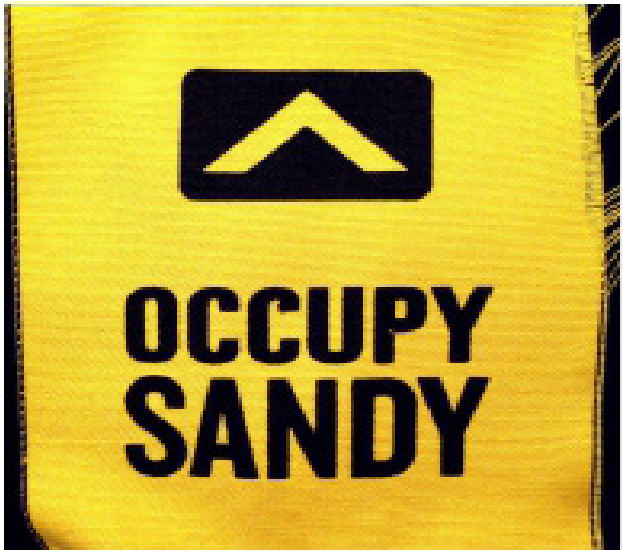

Figure 11. OS wayfinding to relief hubs in the Rockaways, and volunteer armband. (Photos by NAA.)

Use of existing systems included online platforms for coordination. Ronny Nunez, a hub coordinator also managing OS finances, described the initial online effort as "business as usual" as "there was already a large following on Twitter, Facebook, [and] interoccupy.net already had a template for us to work from" (2012). Summoning related on-the-ground mobilization was therefore a well-oiled process, as described by Joan Donovan, an interoccupy.net organizer. "We coordinate in Google Groups, Facebook chat, through Twitter. I've got twenty different browser windows open with calls coming in...We've been able to mobilize very localized networks through InterOccupy throughout the year...When there's a lot of recovery that needs to happen, we know we can call on these networks of people and they'll put their normal lives aside to be part of this effort" (Kavner 2012). Multi-platform efforts also supported the open-spirited, niche innovations which rapidly scaled the resource distribution practices seeded in Zuccotti Park. These included "hacking" the intended use of the Amazon Wedding Registry to allow direct donations and management of inventory in real time (Garber 2012), currently estimated to have

distributed goods to the value of a few million dollars (Nammack 2012); launching an online local business registry to ensure local supply chains were used for rebuilding, in aid of strengthening local economies and capacity; and an Occupy Sandy WePay Paypal account, receiving some $900,000 in donations.

OS began to swell with willing volunteers, aided by a growing collective identification: perceptions of trust, political affinity, open community, and possibly good search engine optimization (SEO). They ranged from OWS sympathizers who had felt alienated by its prior tactics (Nammack 2012), to others who had encountered calls to action online (Goldstein 2012). For example, Jon, now an OS volunteer, had been at home in Los Angeles looking online for ways to support the relief effort. He had only been peripherally aware of Occupy's work in his city, but when he came across information about OS he was drawn to the feelings of inclusion it evoked. He flew to New York City to help: "I looked up on Facebook, saw...that I could email…I didn't know anyone at the Red Cross and FEMA...It felt like a community...You can feel it's easy to fit in. You seem more as brothers and sisters" (Chapelle 2012). As a consequence the OS cohort has been far more diverse than OWS for, as Nunez recalls, "We needed people to come and volunteer…We're more rudderless because of that, because there are more people involved who are less political than in OWS" (2012).

OS subsequently found itself adapting and scaling its practices to suit an emergency relief, city-wide context, although as it scaled it also needed a protocol for maintaining the integrity of Occupy's precepts as a part of its community of practice, and therefore internal resilience. As Nammack explained, orientation in mutual aid became necessary as "there's a lot in Sandy who are not familiar with this. We're attracting a lot of professional types, not trained to step up and step back…So then it becomes a consensus system by definition" (2012). On the ground, consensus translated as the horizontal allocation of tasks to guide a consistent workflow, regardless of who was volunteering at the time, as Nammack further describes: "We're in the kitchen, then mucking out, answering the hotline...We start to cross-train. There's a bias towards people who are generalists, rather than specialists" (2012). Within two months around 18,000 people had registered to volunteer (and anecdotally

up to 40,000, if including unregistered walk-ins). Some accounts appear reminiscent of the affective intensity of Zuccotti Park. "We see each other, talk to one another, eat together, sleep together, fight with each other, volunteer together, ride side-by-side in trucks" (Nammack 2012), which in turn spurred similar hyper-local bursts of innovation, as Nunez observes: "There are lots of patterns: people find niches...there's a critical mass, then there's a dispersal of people working on their own projects—which has turned out not to be a bad thing" (2012).

Yet, as with Occupy's two previous bursts of productive energy, the cyclical question of longer-term sustainability arises. OS has now entered a consolidation phase, reflected in the migration of its public-facing, multi-scale coordination to a standalone website (using OWS's template). At present, OS's communities of practice support long-term, community-led efforts in the Rockaways; Respond and Rebuild for mold remediation and sanitation; ongoing and pop-up volunteer hubs in Staten Island and Brooklyn; the Children's Warehouse (a multi-agency site that serves Brooklyn, Queens, and the Rockaways); services through OS Legal, the Local Business Registry and Wedding Gift Registries for Brooklyn, Staten Island, and the Rockaways; and reproducing similar support models in New Jersey. Efforts have also been dedicated towards creating a collective identity through online platforms including Facebook, independent media channels, and a multi-partnership transmedia project called StoryLine.

However, time will tell to what extent the current nodes of practice will support each other as a distributed system, as some relations are already weakening. Externally, OS's horizontal practices have been criticized as an apparent source of dysfunction, from failing to fully utilize volunteers' professional skills, resisting partnerships with larger (vertical) agencies, and lacking sensitivity when working alongside neighborhood organizations (Schiffman 2013; Ratinam 2013). Internally, a summit held in February 2013 to consider OS's more permanent presence revealed a languishing on-the-ground capacity for using existing working group infrastructure, such as interoccupy.net's online platforms (Suarez 2013).

Beyond Crises

I returned to my home some six weeks after Sandy, basement finally drained of the Gowanus Canal, boiler and electrics fully replaced. While my life has returned to its usual rhythm and most of NYC to its steady, noisy pulse, an invisible crisis continues. For example, the trauma of displacement—what Mindy Fullilove (2005) calls "root shock"—prevails, with some people still living in emergency accommodation (Navarro 2013). The city administration's new Resiliency Taskforce has much work ahead of it, particularly given that its current scope has been limited to housing and hard infrastructure while an entire city system continues to demand attention.

While on many counts OS made an impressively positive impact offering post- hurricane emergency relief, its biggest challenge has been—and remains—the nature of its relationship with government agencies and the city administration. There is huge potential in a collaborative partnership between city agencies and an effective, distributed system at grassroots level. If such a relationship was transparent, productive, and properly resourced, it seems feasible that civic services could be provided with both greater equity and efficiency. However (at least in the case of OS) such a reality is impossible, given that political critique remains at the core of its work, the legacy of intractable tension and mistrust between Occupy and the Bloomberg administration, and OS's continuing political activism to ensure justice in the rebuilding process (see fig. 12). It would seem that the movement's resilience faces the same challenges which Occupy has suffered from in the past, with the communities of practice weakening due to inadequate resources for ongoing, strong collective action; leverage points having lesser impact over time; and facing increasing difficulty developing effective, long-term strategies for reinforcing collective identification. Clearly, this case study of OS is by no means a panacea for urban resilience, although it does offer a broad framework for considering how communities of practice can improve cities' resilience through a distributed system of urban commons practices. There are enormous opportunities for manifesting citywide resilience, but they do require the development of a shared vision and some common goals between stakeholders, and for policymakers to

rescind technocratic practices so that they more actively support commons formation and cultivation.

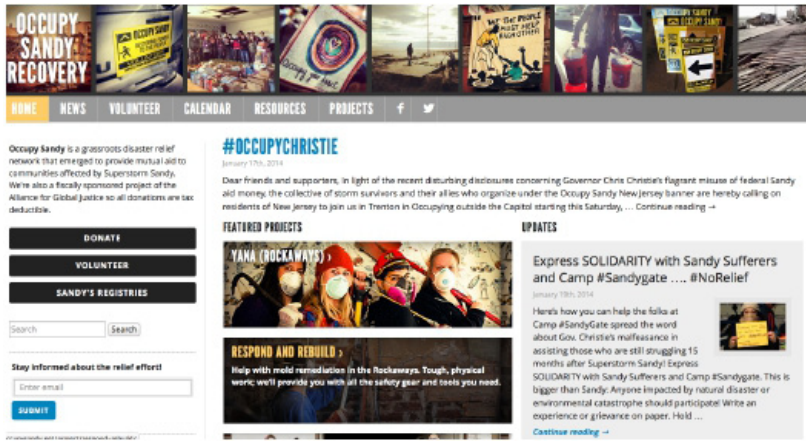

Figure 12. A screenshot from occupysandy.net showing Occupy Sandy's ongoing activism.

From both sides, this involves embracing precepts and practices of open governance, open knowledge, mutual aid, trust, and genuinely investigating the extent to which it would be possible to support grassroots urban commons practices at arm's length. Bureaucratic culture would need to accommodate a new flexibility which recognizes that systems such as these form through iteration, innovate through adaptation, rely on the organic formation of lateral networks, and therefore cannot be wholly designed in advance nor enforced by authorities (Manzini 2012). Essentially, this is a generative form of service design which recognizes communities as a city's greatest resource for sustainability efforts, and supports communities as a part of an adaptive, self-organizing solution rather than being regarded as a problem to be solved. As Ezio Manzini quips, cities need to learn to "expand people's capabilities to be what they want to be and do what they want to do" (2013).

This may seem a daunting bureaucratic task, but small, pragmatic steps can be taken which will make a wider, resilience-enhancing impact. In essence, policymakers will need to temper their agencies' vertical control by allowing the occupants of this

city an untidy exploration of civic life, and find ways to support and integrate emerging distributed systems with city-run programs. The city administration can support and invest strongly in soft infrastructure through a human-centered, multi-scale, multi-platform approach, where "platform" refers not only to online environments, but also the urban commons—the streets, parks, plazas and neighborhood spaces which, as Zuccotti Park revealed, can promote social cohesion through the affective experience of participating in localized collective practices. Practice elements can also be made more readily available to the public by creating the fertile conditions which enable communities of practice to cultivate their own urban commons. At one level this involves bridging digital divides through investment in technological infrastructure, tech-literacy programs, and adopting open data policies. At another, offline opportunities for social cohesion require support through values-based public programming which motivates affective commitment to and collective identification with neighbors, between residents and local businesses, and across whole communities. Public space programming is central to this process, such as street festivals, public markets, co-ops, community-supported agriculture, and public art. This will also help strengthen the offline relationships and communication networks which were found to be so important following the great silence of digital communications following the hurricane.

Half a century ago in 1962, much-loved urbanist Jane Jacobes wrote that "cities have the capability of providing something for everybody, only because, and only when, they are created by everybody," words that ring absolutely true in current times, yet ever more urgently so. There is certainly cause for hope, for, as this case study has shown, while crises are becoming increasingly complex and commonplace, so is our collective capacity to innovate using our immediate resources: technologies, our streets, and the communities around us.

References

Alberti, Marina. *Advances In Urban Ecology: Integrating Human And Ecological Processes In Urban Ecosytems.* Seattle: Springer, 2009.

Bauwens, Michel, Nicolás Mendoza, and Franco Iacomella. "Synthetic Overview of the Collaborative Economy." Report, P2P Foundation, April, 2012. http://p2p.coop/files/reports/collaborative-economy-2012.pdf.

Biggs, Che, Chris Ryan, and John Wiseman. "Distributed Systems: A Design Model for Sustainable and Resilient Infrastructure." Distributed Systems Briefing Paper, Victorian Eco-Innovation Lab and the McCaughey Centre, University of Melbourne, Australia, March, 2010.

Blake, Eric S., Todd B. Kimberlain, Robert J. Berg, John P. Cangialosi, and John L. Beven II. "Tropical Cyclone Report: Hurricane Sandy (AL182012) 22–29 October 2012." Tropical Cyclone Report, National Hurricane Center, United States National Oceanic and Atmospheric Administration's National Weather Service, February 12, 2013.

Cash, David W., W. Neil Adger, Fikret Berkes, Po Garden, Louis Lebel, Per Olsson, Lowell Pritchard, and Oran Young. "Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World." *Ecology and Society 11*, no. 2 (2006): 8–19.

Feuer, Alan. "Where FEMA Fell Short, Occupy Sandy Was There." *New York Times*, November 9, 2012. http://www.nytimes.com/2012/11/11/nyregion/where-fema-fell- short-occupy-sandy-was-there.html?pagewanted=all&_r=0.

Folke, Carl. "Resilience: The Emergence of a Perspective for Social-Ecological Systems Analyses." *Global Environmental Change* 16 (2006): 253–67.

Fullilove, Mindy. *Root Shock: How Tearing Up City Neighborhoods Hurts America, and What We Can Do About It*. New York: One World/Ballantine, 2005.

Garber, Megan. "Occupy Sandy Hacks Amazon's Wedding Registry (in a Good Way)." *The Atlantic*, November 5, 2012.

http://www.theatlantic.com/technology/archive/2012/11/occupy-sandy-hacks- amazons-wedding-registry-in-a-good-way/264543/.

Goldmark, Alex. "The Illuminator: The Occupy Wall Street Bat Signal Returns With A Batmobile," *Co.Exist* (blog), *Fast Company*, March 2, 2012. http://www.fastcoexist.com/1679431/the-illuminator-the-occupy-wall-street-bat-signal- returns-with-a-batmobile.

Goldstein, Katherine. "Is OWS Outperforming the Red Cross in Disaster Relief?" *The Slatest* (blog), *Slate*, November 4, 2012. http://www.slate.com/blogs/the_slatest/2012/11/04/occupy_sandy_hurricane_relief_b eing_led_by_occupy_wall_street.html.

Hobsbawm, Eric. *Revolutionaries*. London: Weidenfeld & Nicolson, 1973.

Holling, C. S. "Resilience and Stability of Ecology Systems." *Annual Review of Ecology and Systematics* 4 (1973): 1–23.

Jacobs, Jane. *The Death and Life of Great American Cities*. New York: Random House, 1962.

Kavner, Lucas. "Occupy Sandy Emerges As Relief Organization For 21st Century, Mastering Social Networks." *Huffington Post*, November 5, 2012. http://www.huffingtonpost.com/2012/11/05/occupy-sandy-relief- efforts_n_2079308.html.

Kim, Richard. "We Are All Human Microphones Now." *The Nation Blog*, *The Nation*, October 30, 2011. http://www.thenation.com/blog/163767/we-are-all-human- microphones-now.

Klinenberg, Eric. "Adaptation: How Can Cities Be 'Climate-Proofed'?" *The New Yorker*, January 7, 2013. http://www.newyorker.com/reporting/2013/01/07/130107fa_fact_klinenberg.

Manzini, Ezio. "Error-Friendliness: How to Deal with the Future Scarcest Resource: The Environmental, Social, Economic Security. That is, How to Design Resilient Socio- Technical Systems." *Architectural Design* 82, no. 4 (July/August 2012): 56–61. doi:10.1002/ad. 1429.

———. "Design for Resilience." Lecture presented at the Pratt Institute, New York City, NY, February 20, 2013.

Marshall, Graham. "Nesting, Subsidiarity, and Community-Based Environmental Governance Beyond the Local." *International Journal of the Commons* 2, no. 1 (2008): 75–97.

Massey, Jonathan, and Brett Snyder. "Mapping Liberty Plaza." *Places Journal*, September 17, 2012a. http://places.designobserver.com/feature/mapping-liberty- plaza-zuccotti-park/35948/.

———. "Occupying Wall Street: Places and Spaces of Political Action." *Places Journal*, September 17, 2012b. http://places.designobserver.com/feature/occupy-wall-street-places-and-spaces-of- political-action/35938/.

Meadows, Donella. "Leverage Points: Places to Intervene in a System." Supplemental paper for the reader at the Linking Knowledge with Action for Sustainability (Weekly Session 11) at the Sustainability Institute, Hartland, VT, November 22, 2010. (Originally published in 1999).

Mosimane, Alfons W., Charles Breen, Bimo A. Nkhata. "Collective Identity and Resilience in the Management of Common Pool Resources." *International Journal of the Commons* 6, no. 2 (2012): 344–62. https://www.thecommonsjournal.org/index.php/ijc/article/view/URN%3ANBN%3ANL%3AUI%3A10-1-113815.

Navarro, Mireya. "Relying on Hotel Rooms for Thousands Uprooted by Hurricane Sandy." *The New York Times*, March 29, 2013. http://www.nytimes.com/2013/03/30/nyregion/relying-on-hotel-rooms-for-thousands- who-were-uprooted-by-hurricane.html.

Oldenburg, Ray. "The Character of Third Places." In *Common Ground?: Readings and Reflections on Public Space*, edited by Anthony M. Orum and Zachary P. Neal, 40–8. New York: Routledge, 2010.

Salingaros, Nikos. "Nikos Salingaros on Peer to Peer Urbanism." By Michel Bauwens. P2P Foundation, September 2008. http://p2pfoundation.net/Nikos_Salingaros_on_Peer_to_Peer_Urbanism.

Schwartz, Mattathias. "Pre-Occupied: The Origins and Future of Occupy Wall Street." *The New Yorker*, November 28, 2011.

http://www.newyorker.com/reporting/2011/11/28/111128fa_fact_schwartz.

Shove, Elizabeth, and Gordon Walker. "Governing Transitions in the Sustainability of Everyday Life." *Research Policy* 39, no. 4 (May 2010): 471–6.

———, Mika Pantzar, and Matt Watson. "Making and Breaking Links." In *The Dynamics of Social Practice: Everyday Life and How It Changes*, 21–41. London: SAGE Publications Ltd., 2012a.

———. "Representing the Dynamics of Social Practice." In *The Dynamics of Social Practice: Everyday Life and How It Changes*, 119–37. London: SAGE Publications Ltd., 2012b.

Walljasper, Jay. *All That We Share: A Field Guide to the Commons*. New York: New Press, 2010.

Wenger, Etienne. "The Concept of Practice." First introduction in *Communities of Practice: Learning, Meaning and Identity (Learning in Doing: Social, Cognitive and Computational Perspectives)*, 45–50. Cambridge, UK: The Press Syndicate of the University of Cambridge, 1999.

———, Richard McDermott, and William M. Snyder. "Communities of Practice and Their Structural Elements." Chap. 2 in *Cultivating Communities of Practice*, 23–47. Boston: Harvard Business School Press, 2002a.

———. "Communities of Practice and Their Value to Organization." Chap. 1 in *Cultivating Communities of Practice*, 1–21. Boston: Harvard Business School Press, 2002b.

Interviews

1. Jon Chapelle (volunteer, Occupy Sandy), interview with the author, December 26, 2012.
2. Daniel Latorre (Occupy Wall Street activist), interview with the author, August 22, 2012.
3. Kristian Nammack (Occupy Wall Street activist) interview with the author, December 26, 2012.
4. Ronnie Nunez (Occupy Wall Street activist) interview with the author, Dec 26, 2012.

5. Mathan Ratinam, (Occupy Wall Street activist) interview with the author, March 21, 2013.
6. Ron Shiffman, (Occupy Wall Street activist) interview with the author March 7, 2013.
7. Ron Suarez, (Occupy Wall Street activist) interview with the author, February 27, 2013.

Part 3

Conclusion

13

The Cell and the Self: If We Slice and Dice Ourselves, Do We End Up as Frankenstein?[1]

by

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Abstract

The emerging era of mobile communication transcends the traditional privileging of text and voice to draw upon sensations of augmented reality and automatically gathered group-generated data. Thus, one will be able to have new views of the local environment (mobile visual services) and of oneself in relationship to a collective (mobile tapping of crowd opinions). In terms of the former, the sense of sight is increasingly being brought to bear on the nexus of physical environment and digital information, yielding literally novel and unprecedented views. In terms of the latter, semi-automated ways of tapping into people's opinions and activities while they are mobile is becoming increasingly popular, yielding new insights into oneself relative to others and group views of persons, places, things, and ideas. This chapter discusses instances of these services and the ways they intermix previously

separate domains, but that also create new layers of separation. In particular, it notes conflicts at the levels of public policy and individual privacy. It explores the social psychological dimension of these technologies and does so by drawing on metaphors from Mary Shelley's novel *Frankenstein; or, The Modern Prometheus*.

Frankenstein as a Multi-Level Metaphor

In Mary Shelley's classic novel, Frankenstein, contrary to popular usage, was not the monster; Frankenstein was the doctor/scientist who made the monster, never officially named in the novel. That lumbering giant went on to arouse the anger of the townspeople who tried to destroy him. He was terribly misunderstood and caused some unfortunate accidents in which people were killed, before finally heading off into the wilderness. Thus, a legend was born.

The story provides some good metaphors that shed light on our current situation vis-à-vis cell phones and other communication gadgets, but of course cannot be taken too literally. Frankenstein's monster was assembled from disparate parts, charged with electricity, and let loose on the world. Ultimately, the monster could neither integrate its various parts effectively nor incorporate itself with society, yet its attempt and that of its creator brought much psychological and physical suffering. Is the same fate in store for us at the physical or psychological level as we seek to assimilate ourselves with our proliferating world of apps and gadgets?

This first science fiction story ever written is not an exact analogy for the situation we find ourselves in with the cell and the self, but there are some interesting metaphorical connections. I want to explore a few of these metaphorical connections regarding how the cell phone is affecting us. However, speaking of metaphors, I want to say that the "cell," or cell phone, is a metaphor for the constantly evolving personal communication technology that is increasingly becoming incorporated not only into our lives, but also into our bodies themselves. Thus, the notion that the cell phone as the "Swiss Army knife" of tools is somewhat appropriate, but an even more precise sense is that it is becoming the machines that are us, that represent us, and act in our stead.

By cell, I mean portable technology that is increasingly integrated with the human body, and that I captured in an edited volume entitled *Machines That Become Us* (2003), referring to the way in which the technology becomes part of us—both physically and psychologically—and the ways others perceive us through and as our technology. At this particular moment in history, the instantiation is the smart phone, but the heads-up visual display (such as the Google Glass and its competitors and successors) may well be the next instantiation. Regardless of any particular technological embodiment, clearly our communication technology is continually evolving towards becoming physically and biologically part of us.

The mobile phone was a profound departure from earlier eras of communication—revolutionary though each of them was in its own time. Until the mobile phone revolution place mattered, formats were limited, and means of production were so capital-intense that individual dissemination of content was extremely difficult (Campbell and Ling, forthcoming). Today's mobile phone-based regime, linked with the internet, constitutes a paradigmatic change from these traditional external, system-based forms of communication technology. This latter set of technologies includes, essentially, one-way forms such as newspapers and magazines, broadcast radio, television, and film. It also includes two-way or multi-way forms, such as the telegraph, the landline telephony system, CB radios, and, of course, mail systems. Think of the continually expanding capabilities the cell phone—it has grown far beyond its voice capabilities, quickly adding texting, then photography, then video, and currently a world of applications. Obviously, there is no need to restrict the basic impulse of mobile connectivity to a handheld device; neither does it need to be restricted to "cells" of a forest of towers. The full spectrum, both electronic and behavioral, can be brought into play through our mobile technologies.

It should not escape notice that these tools are moving ever closer to our cerebellum. Originally, communication technologies had their own fixed devices, if not entirely their own segmented rooms.

But, step-by-step, they have been stealthily creeping up on our brains. First, they proliferated from one station to many rooms.

From many rooms they became cordless. From cordless they became utterly portable, providing one is willing to carry a sack around. From this, it became a slippery slope to the hand, ear, and now the eye. It does not take much imagination to extrapolate a bit further.

Google Glass brings sight into play in a different way than was heretofore practical, if not even imaginable: augmented reality glasses and similar visual interfaces. This technology is not entirely new since people have been using glasses to augment reality (sunglasses, magnifying lenses, etc.), and, in a manner of speaking, mobile television has offered a portable way to visually modify one's ambient environment. Mobile television on cell phones has been pushed for years in North America and Europe. (This has been met with little success.) However, now a new set of visually rich applications for enhancing reality is arriving on the scene. They provide layering of visual material and information over local environments, allowing the user to interact with physical and virtual objects in different ways (Jung, Perez-Mira, and Wiley-Patton 2009). Unlike mobile TV, which allows users to escape or be distracted from local environments, services invite users to interact and become more deeply engaged with local environments.

Looking through the Glass Darkly

Is the "cell" going to gobble up all our other forms of information and communication technology?

The Google Glass technology is a harbinger of a new era in which mobile visual devices would bring artificial intelligence and virtual reality to the ordinary user (Baldwin 2012). The technology itself has been prototyped in various modalities since at least 1997, and Rich Ling has done a service by tracing the evolution of the concept (Ling 2013). Though earlier technology did not win widespread acceptance, the talent of Google engineers and the company's extremely deep pockets mean that whatever *can* be reasonably accomplished with today's technology *will* be—a luxury not enjoyed by earlier innovators. This means that a full-court press will be launched in support of Google Glass and we can expect to see them being used, at least for a while. This, in turn, makes it possible to begin doing serious work on its social consequences.

But even before we can collect good data (and indeed one of the strategies behind this workshop is to determine precisely how to do this), early speculation may be useful if for no other reason than to provide a target for future critics at how inept today's generation of commentators is.

The implications for mobile communication studies are manifold, especially at the level of one's self presentation (Fortunati 2005). Among the most appealing topics is how behavior will change with the local delivery of personally relevant, context-specific information via heads-up visual displays. One such use would be to the ability to recover personal details when one encounters someone previously introduced. When I tell colleagues about Google Glass' technology, they frequently remark how it would be extremely useful in their social lives—how convenient and mentally unburdening to be quickly fed biographical data acquired through social interaction! ("Nice seeing you again, Dr. Hades. How's your dog, Cerberus? Did Mr. Orpheus get home with his wife okay after his recent performance?") They imagine the marvelous interpersonal impression they will make by having such details at their fingertips. The prospect of this affordance prompts them to declare that they would very much like to have the device. Yet it is easy to predict that any presumed advantage would not materialize; or if it did not, such an effect would be evanescent.

Presenting oneself as knowledgeable and interested in another, and thus having remembered their personal details, is valued by the target of that interest, only to the extent that the knowledge appears to represent effort on the part of the actor. Having the aid of the glasses robs any significance from the act of seeming to remember. The performative aspects of projecting interest in another would be no more compelling than the Christmastime emails to mass lists that recite family achievements. This is not to say that there could not be many advantages to such a system, but only that the one to which people gravitate towards immediately would not be among them.

Amid the likely services for such glasses, though, would be enriching the local information environment. For instance, an ordinary street scene could be viewed as it was in an earlier historical era and could be interspersed with news of both historical and contemporary interest (Pavlik and Bridges 2012).

Culturally relevant images and audio could be overlaid on streets or in historical houses. A tour of a museum no longer needs to be arrayed in a linear sequence but could be designed around a theme, such as gender representations or preservation techniques, and fully supplemented by Wikipedia and YouTube-like materials. On the other hand, gangs could also use the device to assess security systems or case a potential robbery target. In terms of virtual reality applications, they could use it to demarcate their territory, using gang symbols invisible or uninterpretable to outsiders. They could also use them to relive drive-by shootings or other gory events. While concerned citizens could use the location-aware glasses to avoid high-crime areas, criminals could use them to stalk victims. As such, these technologies can cut both ways. Too often the rhetoric is triumphalist about the nonconformist possibilities of mobile communication technology (Rheingold 2003); such celebratory visions are often insensitive to misuses. These include, for instance, flash-mob robberies and beatings in Philadelphia, which have become a significant public safety problem. The same critical lens that is applied to dominant regimes could also be applied fruitfully to the full spectrum of uses and abuses of mobile communication technology.

Mobile Location and the Repurposing of Personal Data

This brings us to the sensitive topic of privacy in location-based services (LBS), for which Google Glass might only be a foot in the door. There is, first and foremost, the question of informed consent about who may gather use and reuse data and for what purposes. The glasses can record and analyze all kinds of information, including the personal habits and activities of people who might have a reasonable expectation of privacy. This issue has already been the sharp focus of the use of mobile phone in classrooms to catch misbehaving teachers (Katz 2005). With Google Glass-like tools, there comes a huge set of questions about privacy (along with intellectual property rights, a topic that cannot be explored here). At the very least, policies need to be developed for informed consent. Yet such consent, even if it is truly informed, is only part of the equation. Despite such protections being put in place, there is a long tradition of safeguards being breached the sake of

expediency. Sometimes these breaches are justifiable, but other times not; regardless, they do happen. Second, user-generated data created by these technologies have a great potential to help people get precisely the products and services want, when they want them, and thereby even get introduced to ones about which they had no foreknowledge but that makes them happy or is in some other way gratifying to them. But this information can also be used in manners that can have unintended consequences. Take, for instance, business travel, where tensions already exist in terms of location disclosure (Aizenbud-Reshef et al. 2011). Consider the location-based services designed for Copenhagen's airport (Hansen et al. 2009): they can guide newly arriving passengers to the nearest toilet facilities, taking into consideration not only the distance from the disembarkation point but real-time updates about queue length and wait times for facility availability. This can be highly useful information, especially in an era when the super jumbo Airbus A-380 can disembark over 850 passengers at one time! Data collected at the system level can help facilities planners, yet data could also be collected quietly on an individual basis and then be used to help that individual. This could be true, for example, for visits to the toilet. Even unbeknownst to that person, such data can be recorded and analyzed to detect patterns. The results of this analysis could be used in highly personal ways, including alerting one's doctor about a bladder problem. Insurance companies, too, might want to see these data before issuing a policy, since too frequent (or infrequent) toilet trips could be indicative of an underlying health problem.

Naturally enough, the vacuum cleaner nature of Google Glass is provoking often harsh, negative reactions that range from Luddite to lighthearted and from economic to psychological. For instance, Evgeny Morozov (2013) observes that in 2004 one of the founders of Google, Larry Page, claimed that the company would at some point incorporate its search function in people's brains so that "when you think about something and don't really know much about it, you will automatically get information." For his part, Morozov commented that, "in reality, the implant does not have to be connected to our brains. We carry it in our pockets—it's called a smartphone." He sees that Google Glass can help advertisers by interpreting and predicting user intentions, but doing so requires

vast amounts of data, not only our search interests, but our routines, movements, surroundings, and consumption choices. Google Glass offers an entrée to all that. But, in addition, "the more Google knows about us, the easier it can make predictions about what we want—or will want in the near future. Google Now, the company's latest offering, is meant to do just that: by tracking our every email, appointment and social networking activity, it can predict where we need to be, when, and with whom. Perhaps, it might even order a car to drive us there—the whole point is to relieve us of active decision-making. The implant future is already here—it's just not evenly resisted" (Morozov 2013).

But these concerns about the level of individual services, whether it is ads delivered to us, or us delivering birthday gifts remembered just in time, are small potatoes. The deeper concern with monitoring and privacy is not about its commercial or "Big Brother" aspects alone. As it has always been for most of us, it is the interpersonal constraints that worry us. It is the blunting of our will to power that is imposed on us by our neighbors and workmates that seems to be of greatest concern. These quickly extend upward from the individual to the social structure, less in terms of silencing political dissent but more in terms of suppressing those who might have values that diverge from the dominant society.

Significantly, data collected from the mobile gaze has some other noteworthy possibilities. Teachers could gather data on whether their students are paying attention to a lecture by tracking eye gazes, something not possible in today's settings, where students are able to hide behind their laptops' screens. Of course with Google Glass, the lecture could be presented virtually, providing yet another reason to reduce reliance on the traditional classroom. But why stop at the classroom level? Aggregated on national levels, there could be all kinds of fascinating uses for such data. For example, they could be employed to demonstrate sexism, and inevitably governmental policies would be devised to correct the problem (Voegeli 2011). Is this far-fetched? Hardly. The LBS and glasses could demonstrate that men stare at women, especially those they deem attractive. Yet staring can be (and has been) construed as a form of sexual harassment, at least according to US standards. Additionally, there have been voluntary programs offered at US universities, among other venues, that are aimed at reducing men's unwanted staring at

women. Given the tendency of the law (at least in the US) to hold institutions accountable for behavior of those under their purview, and treat statistical generalities as indicators of systematic decisions and biases on the part of individuals, this social policy logic seems all but preordained. The practice need not be limited to sexism, but any number of other governmentally prescribed goals that can be measured through LBS or gaze-monitoring technologies. Gender, ethnicity, education, and income could be aggregated. Might there be an appearance of ethnic separation? Could segregation be being practiced on an operational or even coincidental level in terms of social interaction, even in the absence of overt policy? Do whites appear to have too few black friends, or vice versa ("few" as defined, for example, by a court)? If so, this could be the basis of a program to encourage (or even require) certain amounts of social interaction. I raise these issues to highlight the way in which individual data, generated both actively and passively as they move around, can be aggregated in ways that not only lead to beneficial outcomes, which are already being seen in the case of traffic jam identification via mobile navigation apps, but also in terms of social policies which could be enabled were there data to drive them (Tarantino 2011). That said, the specter of misuse of mobile data (freely offered, passively collected, or even transaction-generated) continues to hang over mobile applications at policy, group and individual levels.

Clickers and On-the-Go Voting

In addition to the behavioral aggregation discussed above, mobile devices allow opinion aggregation (i.e., voting and responses to surveys). Clickers are but one way to achieve this. These are purpose-built, interactive portable devices, typically allowing five or so responses, which are distributed to audiences or classes, and are becoming popular in group response settings. While clickers are limited in their functionality, the services they provide can be easily ported to any smartphone (or, with some effort, even a regular mobile phone). The most popular domain for such services is the classroom, though churches, fire departments, cruise ships and health care providers are also always discovering new uses for them. In a sense these allow more precise targeting of the phenomenon

of online crowdsourcing (Hoffman 2012). What is important in this context is that voting has tended to be a static phenomenon, in terms of the technology to collect the sentiments of the target population, the population that is registering opinions, and the speed at which the data is collected and analyzed.

Using clickers and their smartphone counterparts, these drawbacks can be overcome. Many instructors already use them to take attendance, check on student learning, and give quizzes. Their use is by no means limited to classrooms but include all kinds of voting- and answer-style contests and games. The public has already had experience using mobiles for voting for pop stars and television contestants but also in a limited way in political contests.

With clickers, and increasingly all smartphones, data can be collected on the fly. People can vote from any place, and any place can present the stimulus setting prompting a vote or otherwise register an opinion. The range of such possibilities is vast—window display designers in New York could have passers-by rate the window, or riders on a train could rate in real-time the conductor's behavior. (Attendees could even do the same for a symphony's conductor!). It is easy to see an extension to television talent programs, where national audiences vote via text and phone for a performer, to other artistic and dramatic endeavors. Doubtless we will soon see, at least on an experimental basis, moment-by-moment dances and other performative demonstrations driven expressly by the ebb and flow of remote or faceless audience. Performers on a stage could alter their pace depending on the audience's reaction. There is no need to stop there: politicians could submit their ideas directly to the public and ask for their reaction (For a discussion of this topic, see Katz 2009). In all these, a critical dimension is that the opportunities for voting allow for a mobile audience, and a mobile device allows for "anywhere, anytime" input.

The use of clickers, and by extension rating systems enabled by mobile communication, has two effects, which at times can reinforce or conflict with each other. The first effect is to make the producers of cultural artifacts more sensitive to the response of and impact on the target audience. An example would be a painting at an exhibition: visitors could vote on whether to display the painting prominently. While this has the virtue of increasing public satisfaction, it has the obvious drawback of unpopular or difficult art not being seen by the public. So, on the plus side, voices not

heard can now register an opinion. This has many virtues. Social comparison is a profound activity, and can be a source of pleasure or even create a game-like atmosphere. Mobile voting technology is useful for engaging audiences, among other activities. Even at the psychological level, it is pleasant to have one's views solicited and taken into account; it is an empowering experience (quite literally, on the social-psychological level), increasing the amount of good feelings humans experience (Lane 2001). Additionally, those interested in the public's views will have a richer data pool, thereby refining or redirecting their efforts. To the extent that both more opinions and votes are taken into account are deemed to be positive, a socially desirable outcome will have been obtained. Yet, there can be a pressure for conformity. Those who have a minority view may feel pressure to conform to those of the majority. And even if their views are not changed, they at least know that they are in the minority, and may feel isolated, defensive, or diminished as a result.

Beyond the individual level is that of the production of culture (Hoffman 2012). As alluded to above, many of society's achievements that we view as great or even iconic would not have been created if doing so had been based on mere popularity. Witness the Eiffel tower, today the national symbol of France, but vilified during its birth as an eyesore that should be immediately torn down. The argument is easily extensible in terms of modern art or literature, and even television programming. Critics warn that taking feedback from clicker surveys is inherently superficial, foreclosing nuanced analysis. It would be hard to write the Great American Novel if it had to be done via constant comment from an audience. Yet while opinions have always affected people (in fact, society depends on that being so), making mobile apps allow instant performative feedback in ways that break free of place. This in turn can yield much tighter feedback on anyone subject to evaluation, from flight attendants to teachers, and from political leaders to band leaders.

Conclusion

In sum, emerging mobile technologies are creating cross-pressures and will have some readily foreseeable advantages and

risks. We have examined two mobile technologies: heads-up interactive visual information displays and real-time mobile opinion aggregation technology. Using the metaphor of Dr. Frankenstein's monster very broadly and loosely, I would submit that we are on the cusp of creating our own modern-day monsters. This monster is also composed of hacked-together parts, assembled from technologies and animated by electricity, but unlike Mary Shelley's wetware, agglomerated mess this is a streamlined, digital, and ultra-fashion sensitive creation.

Between the person wearing Google's glasses, leaving a vast wake of data behind him, or the ever-voting and constantly recommending person who weighs in on everything she sees, we would have a sliced-and-diced Frankenstein monster. Technologically enabled, they are introducing valuable information and numerous peripheral improvements (which extend in many directions, including previously excluded groups, see Goggin 2011). These we must recognize and applaud, but we must also acknowledge that they are introducing subtle constraints to the world around them and the people with whom they interact. This kind of being is also something of a Frankenstein's monster, though operating in a much more subtle way which, due to its subtlety, introduces its own special kind of problems.

Yet the trajectory seems clear: we as a society are aggressively pursuing the intermixing of the cell and the self, increasingly letting ourselves become cultural mashups, remixing other people's forms, and allowing ourselves to be excessively driven by the voice of the people. This leaves us with some questions. Can we make allowances for creativity, oppositional readings, and, in a profound sense, individual freedom, in an increasingly monitored and evaluated world? What will be the long-term effects of instant feedback and evaluation? What will be the implications of the behavioral self-knowledge?

The original Dr. Frankenstein screwed up when he tried to make his creature. Perhaps the latter-day vision I am offering of a sliced-and-diced monster—Internet-connected, passive data-spewing, recommending and in turn recommended or chastised—is one that is unattractive. Yet the metaphor of both the classic Dr. Frankenstein and the Google Glass-eyed one I conjure up here offer an opening perspective on technology and the person. Both

are imaginary experiments that help us better understand how the choices we make affect the world in which we live. We can consider not only what apps you want to use, but what apps we want to become us.

This way we can usefully engage with Dr. Frankenstein's progeny. Given the stakes, communication researchers can generate not only insight but also raise awareness of policy and social issues so that people and institutions can be better prepared to deal wisely with them. Such an alternative is preferable to either spurning the power it offers us or, speaking analogously of the little girl in Shelley's novel, get tossed into the lake by it.

References

Aizenbud-Reshef, Netta, Artem Barger, Yael Dubinsky, Ido Guy, and Shiri Kremer-Davidson. "Privacy Concerns in Enterprise Social Travel: Attitudes and Actions." In *Human-Computer Interaction – INTERACT 2011: 13th IFIP TC 13 International Conference, Lisbon, Portugal, September 5–9, 2011, Proceedings Part II…*, edited by Pedro Campos, Nicholas Graham, Joaquim Jorge, Marco Winckler, and Philippe Palanque, 242–49. Heidelberg: Springer, 2011.

Baldwin, Roberto. "Google Glasses Face Serious Hurdles, Augmented-Reality Experts Say." *Wired*, April 5, 2012. http://www.wired.com/gadgetlab/2012/04/augmented-reality-experts-say-google-glasses-face-serious-hurdles/.

Campbell, Scott W., and Richard Ling. "Not Just a Phone: The Convergence of Mobile Media." In *Media and Social Life*, edited by Mary Beth Oliver and Arthur Raney. New York: Routledge, forthcoming.

Fortunati, Leopoldina. "Mobile Telephone and Presentation of the Self." *Mobile Communications. Computer Supported Cooperative Work* 31, no. 2 (2005): 203–18. Accessed January 3, 2014, doi:10.1007/1-84628-248-9_13.

Goggin, Gerard. "Disability, Mobiles and Social Policy: New Modes of Communication and Governance." In *Mobile Communication: New Dimensions of Social Policy*, edited by James E. Katz, 259–71. Piscataway, NJ: Transaction, 2011.

Hansen, John Paulen, Alexandre Alapetite, Henning Andersen, Lone Malmborg, Jacob Thommesen, Tom Gross, Jan Gulliksen, Paula Kotzé, Lars Oestreicher, Philippe Palanque, Raquel Prates, and Marco Winckler. "Location-based Services and Privacy in Airports." In *Human-Computer Interaction – INTERACT 2009: 12th IFIP TC 13 International Conference, Uppsala, Sweden, August 24–28, 2009, Proceedings Part II…*, edited by Tom Gross, Jan Gulliksen, Paula Kotzé, Lars Oestreicher, Philippe Palanque, Raquel Oliveira Prates, and Marco Winckler, 168–81. Heidelberg: Springer, 2009.

Hoffman, Jan. "Speak Up? Raise Your Hand? That May No Longer Be Necessary." *New York Times*, March 30, 2012.

Jung, Yoonhyuk, Begona Perez-Mira, and Sonja Wiley-Patton. "Consumer Adoption of Mobile TV: Examining Psychological Flow and Media Content." *Computers in Human Behavior* 25, no. 1 (2009): 123–9.

Katz, James E. "Mobile Phones in Educational Settings." In *A Sense of Place*, edited by Kristóf Nyíri, 305–19). Vienna: Passagen Verlag, 2005.

———, ed. *Machines That Become Us: The Social Context of Personal Communication Technology.* Piscataway, NJ: Transaction Publishers, 2003.

———. "Media, la democrazia, e l'Amministrazione Obama: la speranza, senza cambiare?" *Politica Communicazione* 10, no. 3 (2009): 421–31.

Lane, Robert Edwards. *The Loss of Happiness in Market Democracies*. New Haven: Yale University Press, 2001.

Ling, Rich, Diako Mardanbeigi, and Dan Witzner Hansen. "Synergies between Head-Mounted Displays and Head-Mounted Eye Tracking: The Trajectory of Development and its Social Consequences." Paper presented at the Living Inside Mobile Social Information conference, Boston, MA, April 2013.

Morozov, Evgeny. "Google Revolution Isn't Worth Our Privacy." *Financial Times,* April 5, 2013. http://www.ft.com/intl/cms/s/0/2ab9e14e-9d3d-11e2-a8db-00144feabdc0.html#axzz2PhRcck9X.

Pavlik, John, and Franklin Bridges. "Augmented Reality (AR) in Journalism: The Emergence of AR as a Storytelling Medium." *Journalism and Communication Monographs* (forthcoming).

Rheingold, Howard. *Smart Mobs: The Next Social Revolution*. New York: Basic Books, 2003.

Tarantino, Matteo. "Lifeworld Keys and Intractable Objects: Privacy, Politics, and Mobile Symbolic Meanings in Italy." In *Mobile Communication: New Dimensions of Social Policy*, edited by James E. Katz, 241–45. Piscataway, NJ: Transaction, 2011.

Voegeli, William. *Never Enough: America's Limitless Welfare State*. New York: Encounter Books, 2011.

Endnotes

1 Portions of this chapter were previously given as the keynote address at the University of Michigan Conference, "The Cell and the Self," April 27, 2013.

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