DCPAPERS
Proc. Int'l Conf. on Dublin Core and Metadata Applications 2017

'More Than What It Seems': How Critical Theory, Popular Engagement and Apps Like Tinder Can Help Us Reframe Metadata and Its Consequences

Deborah Maron
University of North Carolina, NC, USA
maron@live.unc.edu

Erin Carter
Cisco Systems
erincarter@alumni.unc.edu

Abstract

Metadata is a term no longer only of interest to information professionals; recently, it has also compelled a wider global population. How might the metadata community guide popular understandings around metadata's relationship to privacy, surveillance, and identity building, while also taking cues from the outside to complement current professional practice? Rather than taking at face value the definitions, presentations, skills, practices and situations that we are told constitute the concept of metadata, we can consider alternative and complementary thinking, broadening what we consider to be metadata at all; this process of rethinking is known as *problematization* and has its roots in critical theory. We use problematization, as well as critical theory constructs like Derrida's *différance* and *digital trace,* to examine the popular dating site Tinder, which we consider to be metadata in its own right. In doing so, we make new assumptions about metadata and its implications in digitally-mediated, surveilled identity construction. We hope that our effort—a contribution to Science and Technology Studies (STS) and also to metadata studies—has professional implications, such as providing companion methods for reading metadata-dependent systems as 'material metadata discourse.' We likewise hope to show that popular, wider-world discourse can cast back onto our profession in a meaningful way.

Keywords: metadata; critical theory; Jacques Derrida; différance; Tinder; digital trace; Bruno Latour; social media; materiality; philosophy

1. Introduction

If a person has remained engaged with the library and information field since the 1980s then they are likely acquainted with the term 'metadata'—at the very least, in the simplified 'data about data' sense. Metadata is a term most familiar to individuals working in descriptive or Linked Data arenas, due in part to the formation of an individuated 'metadata community' developing standards like the Dublin Core, MODS, METS, and auxiliary standards like the Resource Description Framework (RDF) (Coyle, 2005; Harper, 2010). A professional notion of metadata, relating to standards and their encoding schemes, endures in the individuated 'metadata community,' but has been augmented by recent popular 'outsider' interest in metadata, an interest precipitated by recent events relating to metadata's role in issues of privacy and surveillance. We are now ushered into an age where information professionals and laypeople alike are compelled by 'metadata.' It has become so pervasive, we might be living not just in a world *with* metadata but in what Claudio Celis calls a society *of* metadata (Celis, 2015).

In the metadata community, we have our professional understandings of what metadata is, and this influences how we analyze systems using metadata. Typically this involves assessing something like a digital library for its adherence to rules of a standard, like the Dublin Core, via empirical means. Such approaches or methods tell us implicitly how much the metadata dictums of findability, organization and clear description are valued in a library or archive. Though empirical research methods are rigorous and useful to us, we wonder if 'metadata systems' might

https://doi.org/10.23106/dcmi.952137836

benefit from a complementary, qualitative critical treatment that elucidates the ethical, feminist, or identity-forming consequences of their metadata schema implementations. Although there are limited examples from the 'metadata community' that give such qualitatively critical treatments to metadata systems, there are plenty from the 'wider world' as a result of popular media's metadata maelstrom. What if we take cues from the wider world, letting professional metadata 'learn' from the popular interest? A branch of philosophy called *critical theory*, specifically its notion of *problematization*—or the act of turning a practice or thing into a critical object of study—can provide methods of alternative analysis while we as metadata professionals assimilate ideas and concerns from 'popular' conceptions about metadata.

Though there are many popular examples illustrating metadata's critical potentials, we choose to problematize how metadata constructs the virtual identity and relative value of people in the dating application Tinder, which can play out in inequitable ways. Our twofold contribution is to 1) contribute to Science and Technology Studies as well as Metadata Studies 'from the inside,' by asserting critical theory as a useful apparatus for examining metadata and 2) offer complementary methods—specifically, the apparatus *différance and digital trace*—for problematizing and reframing metadata-dependent systems as pervasive, infrastructural 'metadata material discourse.' This undertaking has several useful implications for the politics of metadata (i.e. how metadata is regarded in the wider world, and how we as metadata professionals might engage the populace on the subject) as well as for professional practice and future work.

2. Historical Background

Metadata, a term familiar in libraries and other information-related fields, became known to information professionals in the 1990s as OCLC developed the Dublin Core metadata standard for describing objects. Around this time, a sister standard, the Resource Description Framework (RDF) was developed alongside Dublin Core so that both could be used for Semantic Web work, making the objects they describe even more accessible and interlinked (Harper, 2010). As Dublin Core and complementary encoding schemes like the eXtensible Markup Language (XML) and RDF gained steam, the nascent metadata community helmed by organizations like the Dublin Core Metadata Initiative (DCMI) had, by the late 2000s, created a conceptual identity around professional metadata that was separate from traditional cataloguing and classification, despite these other fields also dealing in descriptive work (Coyle, 2005). Henceforth, in the metadata community the term 'metadata' not only commonly referred to things (e.g. XML-encoded Dublin Core records or RDF serializations), but also to the practices of developing these specific kinds of things.

Metadata, however, would not remain a purely pragmatic thing, of interest to information professionals only. Within the last decade, metadata's political and ethical consequences have commanded the attention of a mass audience, most notably resulting from 'whistleblower' Edward Snowden releasing classified information about the assumedly private data—or better, metadata—that the US government collects on its citizens (Lyon, 2014). This revelation generated a tempest in the US and abroad, with average citizens asking, "What *is* metadata, and should I be worried about it?", as scholars and journalists scrambled to answer this complex question in blogs, articles, and books. Consequently, metadata has now assumed a primary place in our everyday concerns and activities, including (even if we are not conscious of it) in the ways we construct our love lives.

3. State of the Art

In light of the mainstream audience's interest in metadata and its relationship to surveillance, a Teen Vogue article defines metadata for its readers as not the 'content' of your photos and texts, but as the 'stuff' about them (Kobie, 2017). This simple definition geared at the ordinary populace is not a complete departure from the professional, reigning consensus on metadata. Definitions from the metadata community typically align with that of Marcia Zeng and Jian Qin's, with metadata described as "structured, encoded data that describe the characteristics of

https://doi.org/10.23106/dcmi.952137836

information bearing entities and as such enable functions for identifying, discovering, assessing, and managing the entities" (Zeng & Qin, 2008). This definition encapsulates metadata work in its commonplace, practical sense. It is thus a useful pragmatic definition. (Coyle, 2005; Mitchell & Greenberg, 2009).

Metadata-dependent systems, for instance digital libraries and repositories, are often evaluated according to how well the implementation and usage match professional definitions and criteria like Zeng and Qin's, or relatedly, if metadata is correct according to prevailing standards (e.g., the Dublin Core). For example, Sarah Shreeves et al. and others have done studies on metadata usage in digital libraries, with a focus on how individual records do or do not flout rules of the Dublin Core (Shreeves et al., 2005, 2006). Analyses, like the ones Shreeves et al. perform of metadata dependent systems, are often rigorous in their focus on the empirical data a metadata record presents to us (e.g., does the dc:format element actually include a format in the value?). However, some scholars with an interest in information studies suggest other methods which might complement such empirical rigor. The late Claudio Ciborra writes of a scientized approach to systems analysis:

> [By] adopting the scientific mode of discourse, systems methodologies turn themselves away from everyday human dealings with technology, and find a (shaky) refuge in general and abstract dispositions and norms. They dislodge the problem of human existence out of the development and use of systems, and attempt to fill this ontological gap with the appearances of logic, objects, standards, and measurements, to, as concerned practitioners all over the world can testify, little avail (Ciborra, 2002).

Although studies like Shreeves et al.'s usefully and in great detail point to how metadata usage is often 'incorrect' in systems like digital libraries, and how this affects things like metadata harvesting, we might be left wondering about an implemented schema's sociopolitical or ethical consequences. With this in mind, we can follow Ciborra and perhaps reframe the professional notion around metadata as more complex than it seems at first glance. Contemplating what metadata as a discipline of practice should be, we can also reconsider how metadata, as a thing, manifests beyond the pragmatics of definitions and standards. We know that quantitative methodology has a useful place in assessing professional metadata practice. We have also addressed that an idea of metadata is now on the average person's radar, a 'lived world' phenomenon with potential numerous consequences. We can then ask: Can 'professional' metadata and 'popular' metadata meet in the middle? Can metadata practice 'learn' from the popular existence of metadata, that is, metadata in everyday, non-bibliographic platforms?

Such a consideration leads quite naturally to interrogating different philosophies and approaches to social science. The scientific method is one means to understand our world and the things in it (note that this method correlates with Ciborra's take on the *de facto* method of systems analysis), but many philosophers since the mid-20th century entertain *qualitative,* multiperspectival, highly interpretive conceptual views of everyday phenomena, including disciplines and their objects of study. Library and information science, and its constituent areas such as metadata, can also be read philosophically. Useful for this undertaking is *critical theory*, a philosophy first developed in the Frankfurt School in the 1930's which reframes everyday phenomena—and our relationships with them—using ideologies and other constructs (e.g., power, labor, identity, technology). This reframing—or *problematization*—changes a phenomenon taken for granted, or regarded commonsensically in our lived world, into a *critical* object of study. Problematizations in LIS have been posed by other researchers, addressing things like: 'Are bibliographic subjects objectively true, or subjectively constructed?', 'Does feminist theory help us more equitably understand web technology such as algorithms which judge traits like beauty, or schemes like Library of Congress Subject Headings?', 'Should we understand information retrieval in terms of labor or philosophy of language?', and so on (Blair, 1992; Furner, 2012; Rieder, 2016; Warner, 2010). Following this approach, we could complement Shreeves et al.'s study by asking, "What are the ethical, feminist, queer or political implications

https://doi.org/10.23106/dcmi.952137836

of the Dublin Core application profiles (and element/attribute mismatches) implemented by particular organizations?"

Problematizations of metadata as a practice and a thing are somewhat uncommon within the metadata community—but that is not to say problematizations do not exist. For example, addressing an information science audience, Fidler and Acker go beyond ordinary definitions and understandings of metadata to problematize the Host-Host protocol ARPANET as metadata infrastructure providing a web of *infradata* (Fidler and Acker, 2017; we will revisit other, more pertinent *problematizations* of metadata imminently). On the other hand, popular culture outlets, including news media, are rife with metadata problematizations, or at least discussions of metadata's consequences. To this effect, 'metadata' has accrued problematic or negative connotations among lay consumers of information. The NSA-led collection of telephone and internet metadata revealed by Edward Snowden instigated privacy watchdog groups to monitor the pervasive reach of metadata, with one group stating "an individual's patterns of behaviour, viewpoints, interactions and associations" make it possible to "compile a very detailed and invasive picture of the entire population including their behaviours and interactions" (Privacy International, n.d.). Controversies raged about the extent to which this collection may or may not have violated the constitutionally-guaranteed privacy of citizens; while US President Barack Obama famously assured Americans that "nobody is listening to your telephone calls" (Obama, 2013), many argued that metadata itself tracks a significant amount of one's daily life. To quote Snowden himself, "'Metadata' means records about your private activities and associations. It's an activity dossier" (Snowden, 2015). Big data scientists have voiced concerns that "the questions raised... suggest that an ethical turn becomes more urgent as a mode of critique" (Lyon, 2014). In this vein, the scholar, journalist and privacy expert Zeynep Tufekci addresses metadata ethicality by telling Teen Vogue readers in a recent article what encrypted phone apps they should use for texting and sending photos to avoid government scrutiny. For a wider audience, Tufekci addresses surveilling potentials of metadata in her recent book on social media and worldwide protest movements (Chotiner, 2017). News media have begun to unpack the ways in which the reconstruction of a person's identity via their metadata (specifically, social media metadata) can have consequences in the immigration arena. For instance, US President Donald Trump recently announced intentions to screen select visitors to the United States via required handoff of social media usernames (Kravets, 2017).

What in particular compels us as authors of this paper are non-governmental uses of social media, namely profitable apps for dating, which critics have noted are pervasive in our society (Levine, 2015). We hope, through problematization, to demonstrate that the phenomenon of modern dating sites (with the particular example of the popular mobile app, Tinder) is wholly reliant on metadata from various sources that both monitors and constructs its users' virtual presences, sometimes to discriminatory effects.

4. Critical Occasion

Via problematization of Tinder, we aim to contribute to this changing idea of metadata in our own way, from within the metadata community. The opportunity now arises for us to explain our position around metadata. Both of us, the authors of this paper, studied library and information science and self-identify as 'metadata people.' One author (Deborah Maron) worked in metadata and digital libraries for several years, approaching the subject of metadata rigorously in an empirical sense; although evaluating accuracy in standards implementations in this manner is still important to her, she was made aware of critical theory as a useful apparatus for problematizing metadata due to recent pursuits in communication studies and philosophy. The other author (Erin Carter) is a technology professional with a background in communication and media studies who has also worked in metadata. We, the authors, share an interest in the effects of communication technology on society, and a concern for the social justice issues which arise from this interaction. Recent conversations around current events and metadata's nascent role in them, as well as our mutual vested interest in metadata overall, lead us to consider how a scientific

https://doi.org/10.23106/dcmi.952137836

mindset could pair with other critical apparatus for doing the job of metadata or just examining metadata 'as a thing.' Additionally, we are millennials in the online dating milieu—specifically, we are white/female/feminist users of dating app Tinder.

Part of our perspective involves looking at different fields using critical theory. Particularly influential is Science and Technology studies (STS), a discipline which makes liberal use of critical theory at the intersection of humanity and technology. Recent scholarship in STS has problematized metadata in ways related to, for example, labor, capital and surveillance. Some individuals writing in STS come from library and information science (and their works are represented in publications like JASIST, Knowledge Organization, Library Juice, and Journal of Documentation, among others). Drawing from critical theory, STS, and our position, we aim to make two contributions in this paper:

1. Our general contribution: We hope to contribute to the longstanding tradition of STS scholars examining technology's role in the context of our evolving societal landscape, while also contributing to members of the metadata community's recent forays into problematizing metadata.
2. Our specific contribution: Following Lapôtre (2017), we contend that although oftentimes data and metadata are kept completely distinct, we believe that both are actually *material* (that is: *active*), and through a critical lens, the ways we study data can sometimes become the ways we study this 'material metadata discourse.' Further, we contend that there are alternative 'problematized' ways to read a system comprised of metadata that diverge from the positivist methods typically invoked, and these problematized readings can in turn shed light on other issues such as ethics, identity, surveillance, discrimination, credibility, etc. We hope in this foray to instigate critical discussion by treating more things perhaps typically considered 'data' only, as material and problematized metadata, an action which has particularly salient consequences for identity formation online.

We look to STS as well as constructs from literary theory, sociology, and Francophone philosophy to explore one facet of material metadata discourse in our lived experience: social media's 'metadata.' As previously mentioned, social media metadata is currently part of the cultural dialogue, and critical in identity building online. With social media in mind, we define a critical substrate involving the concepts of metadata-as-infrastructure (Jeff Pomerantz) and material discourse (from various rhetoricians and Digital Humanities scholars). From there we use différance (Jacques Derrida) and digital trace (from Bruno Latour and other Francophone philosophers) as methods to problematize social media metadata as a pervasive material infrastructure. Our case study and method involves a popular web resource—Tinder—with the user-facing information of the software not considered data, but instead, 'material metadata discourse.' We now offer a companion method to the positivist read of a system through our use of problematization and critical theory for the specific case of Tinder.

5. Conceptual Analysis

5.1. Metadata as Infrastructure and Material Discourse

Scholars such as Zeng and Qin contend that metadata is everywhere (2008). However, the evolution of 'the professional metadata account' or the way metadata has been professionalized has limited the scope of what they and others consider to be metadata in a theoretical and practical sense. For the purposes of this paper we favor a more liberal account derived from problematization. Another LIS scholar and metadata instructor—Jeff Pomerantz—in his recent book *Metadata,* uses an STS lens in problematizing and critiquing what he sees as the pervasive infrastructure (or "metadata grid") that undergirds a world of technology and human interaction:

> Metadata is infrastructural, like the electrical grid or the highway system. These pieces of modern infrastructure are indispensable but are also only the tip of the iceberg: when you flick on a lightswitch, for example, you are the end user of a large set of technologies and policies. Individually, these technologies and policies may be minor, and may seem

https://doi.org/10.23106/dcmi.952137836

> trivial… but in the aggregate, they have far-reaching cultural and economic implications. And it's the same with metadata. Metadata, like the electrical grid and the highway system, fades into the background of everyday life, taken for granted as just part of what makes modern life run smoothly (Pomerantz, 2015).

A metadata electrical grid metaphor is not outlandish, given that scholars outside library science have relied on more radical metaphors to problematize pervasive technology, like Cthulu for describing biophysics and kinship, or hospitality industry standards for how we should 'treat' information and communication technology (Ciborra, 2002; Haraway, 2015). Pomerantz's explanation is useful to us because he contends metadata drives everyday digitally mediated experience, down to our ATM transactions—and by extension, the mobile apps we use to enhance our lived experience. It is precisely this pervasiveness that allows us to say that 'metadata can be anywhere or anything.'

Our second critical contention construes metadata studies as part of a tradition of examining *material discourse.* We firstly refer to 'discourse' in its more colloquial and basic sense, as spoken or written content that conveys meaning. Yet, "discourses are more than ways of thinking and producing meaning. They constitute the 'nature' of the body, unconscious and conscious mind and emotional life of the subjects they seek to govern" (Weedon, 1987, p. 108). Discourses are also a "form of *power* that circulates in the social field and can attach to strategies of domination as well as those of resistance" (Diamond and Quinby, 1988, as cited in Pinkus, 1996). Second, to take something as a *material* permutation is not merely to address its tangibility; materiality also accounts for a willingness/ability to engage, or how we engage, with that material thing. That is, material is *active*. To bring in an example from an LIS scholar, Johanna Drucker reconsiders computer infrastructures and things like algorithms as material in Digital Humanities scholarship (Drucker, 2013).

'Material discourse' typically transcends the textual realm, but when we take cues from literary theory, nearly any material discourse can be examined for qualities similar to those of text. Digital rhetoricians have reimagined things like forums, blogs, app platforms and much other "website stuff" as material discourse (Eyman, 2015). We propose that much web metadata exists materially; it is something with which we engage. This holds even more water if we bring in discussions of the nature of documents and information. Michael Buckland and Suzanne Briet claim non-textual things (even antelopes!) can hold informational value; therefore, it seems reasonable that metadata, as information things, can exist in various material permutations, as well (Buckland, 1997). Notably for us, Raphaëlle Lapôtre (2017) has recently problematized bibliographic metadata as a material phenomenon. We extend her contention slightly, proposing the concept of 'material metadata discourse,' which might challenge conventional and popular wisdom about the limits of metadata. We speak here of data which describes people, places and things (metadata); with which we interact (materially); and which also has consequences for power and ethics by monitoring and constructing us (discourse).

5.2. Case Study: Tinder as *Différance* and Digital Traces

Jacques Derrida originated the term *différance* as a two-fold concept describing the way meaning is constructed and transferred. Derrida says that the meaning of information is only intelligible in relation to other information which describes, defines, and informs it—thus, when information pertaining to a topic is accessed by a reader, its meaning is inevitably 'deferred' through a chain of other associated meanings which are called forth through the interaction between the reader and their knowledge of whatever other information has been used to describe, define, and inform that topic in that particular reader's experience (Derrida, 2002). We can apply Derrida's concept of *différance* to the study of 'digital traces,' as traces themselves are active *material*. Digital traces refer to the composition of of "a 'digital identity'... [as] the collection or the sum of digital traces—be they written, audio or video documents, logins, online purchases, or browsing sessions—that are left behind, deliberately or unconsciously, throughout the network of

https://doi.org/10.23106/dcmi.952137836

a user's online relationships and exchanges" (Riegeluth, 2014). Digital traces are an unavoidable byproduct of computer-mediated human interaction. There is always a trace in text (the *différance*) of something, some implication or meaning, that came before in complex web interactions and interrelations. Metadata, understood in terms of digital trace/*différance*, is an amalgam of different temporalities and web loci (i.e., material metadata discourse) that describe and define an object of interest—in this case, a human being.

How is it that metadata affects our virtual and corporeal identity, and how do we allow it to do so when engaging with web technologies? We can understand digital traces as being constructed through a chain of other digital traces informing a user's persistent identity throughout various platforms and creating an overall digital depiction of that person—we can call this a 'digital avatar.' Other information scholars have studied digital identity formation in recent years (see Carter et al.'s discussion of information systems as "medium, determinant, and consequent of identity" [Carter et al., in press]). One place people build representations of themselves through digital traces is on a popular mobile dating app, a piece of material metadata discourse: Tinder.

Tinder does not allow account creation without a Facebook profile; a profile is generated via Facebook's (and other apps') *digital traces*, the traces themselves material metadata discourse. When a person creates a dating profile on Tinder, they grant permission for the app to view and use metadata that describes them from their Facebook profile. Facebook, which many of us know as a confluence of personal opinions, experiences, and other material evidence, forms a virtual idea of a 'corporeal body.' A person's Tinder profile, then, is partially constituted by Facebook's notion of one's past and present. Tinder is one place of many for the digital avatar to flourish, and, as a metadata locus, goes beyond quotidian corporeal attributes like age and location to present potential romantic partners with even more interesting information about a person.

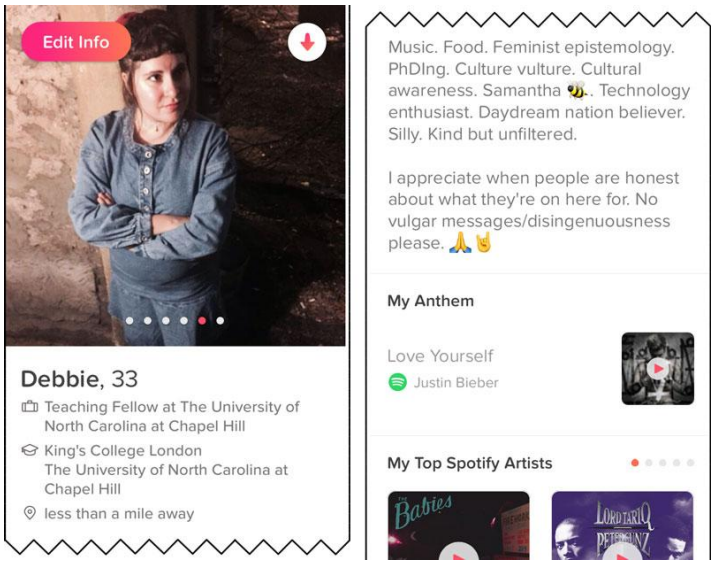

FIG. 1. Tinder profile illustrating an egregious default musical anthem, among other metadata

Metadata traces precipitate action and are themselves active material, fluid and engaged in discourse/narrative construction with one another. They also are construed here as 'meta' by virtue of their role in describing the virtual and corporeal self in digital dialogue. We define two major types of digital trace metadata in Tinder: *referential,* that which refers to the self or to other individuals in an obvious way on the interface, constituting the user-facing profile itself; and *transactional,* e.g. logs/statistics tracked by Tinder which are co-constructed by user behaviors and algorithmically determine matches for a user based on their perceived dating 'value' (note that this is an opaque process which a user knows little about, but its existence has been confirmed by Tinder). But what, exactly, constitutes a digital trace, or piece of metadata, in the

https://doi.org/10.23106/dcmi.952137836

context of Tinder? Digital communication scholars have already established a piece of referential metadata—digital photographs—as 'digital traces' or 'digital footprints' which can be paired with an individual's online identity and traced through time and space (Girardin, 2008). Users choose their Tinder profile photographs; some are innocuous, while others depict wild nights out, complete with illicit drug use, drinking to excess, etc. Such life choices-as-referential-metadata trace from other social media such as Facebook.

Consequently, although Tinder profiles are on the surface *singular* entities representing a single person, digital traces can assign relative value to profiles, and profile metadata can transactionally affect the value of other people's profile metadata on Tinder. For instance, even if someone does not include a particular incriminating photo on Tinder, its existence can still be corroborated by that piece of 'material metadata' having been spotted on other dating sites. It is a trace which is, inescapably, part of a user's avatar that exists across digital space. The 'original' digital traces of a person's Facebook identity to which Tinder profiles refer are not even the person's authentic corporeal self, of course; rather, what one sees is self-created and self-selected metadata. A user has reconstructed a dating avatar (from metadata) using digital traces when they create a new social media profile which connects to extant social media accounts. The metadata describes a digitally curated (and questionably veracious) alternate version of the corporeal person, although the tendency to collect, select and project a more positive image has been well documented for more than a decade (Ellison, 2006).

In addition to adding metadata from a Facebook profile, Tinder users are invited to connect other social media accounts, such as Instagram and Spotify, which proffer more sources of referential metadata about a person in pictures and music tastes. When Spotify is connected, one's tastes, perhaps for particularly unfashionable musicians, are linked by default, although a person can alter this metadata to include artists and songs they would rather others see. Interestingly, when Instagram is connected, the user is offered much less of an opportunity to curate and customize their 'metadata traces' than they are with the initial granting of access to Facebook data. These tastes are inked indelibly onto their Tinder profile; there is no way to hide one's proclivity to egregiously photograph one's food (or take 'selfies,' for that matter). Just as Latour contends that other virtual centers of identity co-influence a particular locus or instance of identity (Latour, 2012), Instagram and Spotify traces likewise inform and influence prospective romantic matches on Tinder.

Other influential criteria that might attract or dissuade potential romantic partners in 'real life' are amplified in dating apps like Tinder, perpetuating various forms of discrimination: such criteria (in our scheme, translated in/as metadata presented to users either visually or textually, explicitly or implicitly) are ethnicity, class and age. Cultural theorists have written about these issues in the context of dating apps; Juana Rodriguez "argues that online space is an informational assemblage that reproduces colonial relations of power to construct racial otherness" (Rodriguez, as cited in Raj, 2011). Francisco verifies this in a recent article about Tinder, writing that "...black women and Asian men are the demographics on which the highest number of people swipe 'left,' thereby rejecting them... Black women and Asian men make up two demographics that have been long stigmatized as not-ideal sexual and romantic partners" (Francisco, 2017). Tinder also defaults to include metadata traces from Facebook such as one's education, occupation, and institutional affiliations; these traces inform the user of a potential partner's likely income bracket and perhaps, if such affiliations are elite, an elite 'valuation.' Additionally, Tinder's pricing structure reifies virtual social class and age: while most users use the free version of the app, a user can pay for a number of enhancements to their basic profile with a premium account, called 'Tinder Plus' (featuring the ability to have their profile shown to more people, etc.). This upgrade comes with an age-determined pricing structure: For those aged 29 and younger, the cost is ~$10 per month; however, starting at age 30, the price doubles (Abel, 2015). In this way, a user's digital traces have a direct financial impact on their pursuit of love, and simultaneously devalue them as they age. In sum, these traces of ethnicity, class and age appear initially as materially-discursive, *referential* metadata in profiles (names, pictures and otherwise), but translate into *transactional*, 'behind the scenes' value when other users utilize

https://doi.org/10.23106/dcmi.952137836

them to make a determination of interest or lack thereof (and when Tinder monitors such metadata to determine who are the most 'swiped on,' 'valuable' users to match with other 'valuable' users).

6. Discussion

Consideration of metadata as a pervasive infrastructural and material phenomenon, in the way we have construed it here, has a myriad of personal and political consequences which are relevant to Science and Technology Studies' frequent focus on ethical concerns. Our digital traces, which we consider a way to perceive aspects of material metadata discourse, affect how we as *users* build identity and are surveilled, as well as how others treat us. We consider Tinder not just a system to be read as a 'bunch of metadata' with no intended effects, but as a system of active material discourse that constructs the user and their experience in that system. It has been documented anecdotally and via data collection and analysis that Tinder perpetuates a cycle of inequity through their use of material metadata, "bumping" certain users up and demoting others based on ethnicity (Francisco, 2017). Likewise, library science has, for many years, maintained an interest in the effects and unequal distribution of library utilization and information-seeking behavior of minority groups (Spink and Cole, 2001). Notably, African-Americans appear to be inadequately served in both Tinder and library systems (Hughes-Hassell, Bracy and Rawson, 2017).

How should we as metadata professionals critically consider the boons and banes of our surveilling approaches and perhaps communicate our techniques with a metadata-focused populace? How does surveilling in the Tinder sphere cast back on how we view gender, social and racial equitability in use of systems such as libraries? We consider two examples for the professional practice of workplace metadata technology which could benefit from a critical treatment like the one presented here. In the library context, we need only to look to transaction logs to find user-generated metadata which can be used for surveillance or monitoring purposes. Although library patrons may be less aware that they are creating metadata, they do so as they select and borrow materials. Should we as metadata professionals think about how the metadata driving our systems might in some cases perpetuate inequity, or that perhaps we have not been 'keeping an eye out' for inequitable systems? As *professionals*, if we do not consider metadata implications as opportunities for study by metadata professionals, we risk losing out on not only improving our systems but also a larger cultural moment and an opportunity to share our knowledge and experience with an eager wider audience. Claudio Celis addresses a communication studies audience when he argues that we live in "societies of metadata" resulting from a cyber, machinic and human mashing; so why don't we as metadata professionals heed the call to pursue the effects of such societies (Celis, 2015; Fidler & Acker, 2017)? In assimilating concerns such as those learned from Tinder, we need not abandon the rigorous approaches we use to examine things like metadata standards implementations, but instead we can complement such approaches by turning a critical eye to the systems implementing metadata by examining additional ethical issues. Critical theory (our choice, but by no means the only choice), coupled with something like digital rhetoric's ideas around material discourse, allows us as both researchers and practitioners of metadata to remain skeptical, critical and multiperspectival in the work we produce and consume.

Another example appears in the world of bibliographic metadata: the digital library. So many LIS systems, like digital libraries, are metadata dependent. Considering that many systems are also being RDF-ized, digital libraries—as records or entire archives—are ever more transportable, shareable, interoperable, engageable and active with other points of metadata; that is, they are *materially discursive metadata* as well as webs of *digital traces.* In the manner we investigate Tinder, examining its implications as a digital trace mechanism that designs identity and inequity, we can also look at the ethical implications of material metadata discourse such as digital libraries by considering that the encoded content itself has *reifying* potential if it contains

https://doi.org/10.23106/dcmi.952137836

erroneous information about people, places, or things (Thomas, 2012). Such erroneous metadata can, at times, neither be changed nor ignored by people interacting with it.

7. Conclusion

By considering more things to be materially discursive metadata, and considering how the wider world's conceptions of metadata are consequential for our professional endeavors (and of course, how wider world conceptions cast back onto our profession), we gain an opportunity to extend the scope of what we do while improving things from 'inside' the metadata world. In this paper, we examine online identity formation via 'material metadata' in social media and the dating app Tinder. This effort 1) contributes to Science and Technology Studies as well as Metadata Studies by promoting critical theory and problematization from inside the metadata community; and 2) provides complementary methods—specifically, the apparatus *différance and digital trace*—to scientized methods for problematizing and reframing metadata-dependent systems as pervasive, infrastructural 'metadata material discourse,' an act which also blurs the distinction between data and metadata and so opens doors for research by our community.

If practitioners and scholars of metadata deem critical theory a useful companion methodology to scientific rigor, we might imagine a rich possible future of research opportunities. Using referential and transactional digital traces, for instance, we could explore the consequences of AirBnB-as-metadata, or Uber-as-metadata. One other critical concept we believe holds much promise is the *boundary object*, something that retains its integrity across spaces while adapting to different communities' needs (e.g. a map, to a cartographer, is something different than a map, to a museum collector—yet it still remains a 'map'; thus, it is a boundary object) (Bowker & Star, 1999). We believe boundary objects could help frame and criticize things like metadata crosswalks, or other newly-emerging forms of 'material metadata discourse' such as online forums, memes, and other materials which take different identities across the communities that repost and comment on them.

But we need not rest only on structural metaphors in critical theory. We can also examine something like a professional metadata creator's intentions, as well as ramifications for users of metadata, by looking at *epistemologies* illuminating the positions, motives and beliefs of individuals and institutions. For example, feminist or Marxist epistemologies can frame Dublin Core or customized Application Profile usage to help us understand an organization's values or how an implementation might contribute to resistance movements, etc. (Pastva, 2014). Critical theory is but one item in the critical toolbox. Critical theory-as-method can help us successfully breach multiple worlds in a way that enables metadata to be 'more than what it seems.'

Acknowledgements

We would like to thank the organizational reading group (org) as well as our DCMI conference reviewers for their invaluable comments on earlier iterations of this paper.

References

Abel, J. (2017, February 21). Tinder Plus costs $10 monthly unless you're 30 or older; then it's $20. *Consumer Affairs*. Retrieved September 16, 2017, from https://www.consumeraffairs.com/news/tinder-plus-costs-10-monthly-unless-youre-30-or-older-then-its-20-030615.html

Blair, D. C. (1992). Information retrieval and the philosophy of language. *Computer Journal*, 35, 200–207.

Bowker, G., & Star, S. L. (1999). *Sorting things out*. Classification and its consequences.

Buckland, M. K. (1997). What is a "document"? *Journal of the American Society for Information Science (1986-1998)*, 48(9), 804.

Carter, M., Compeau, D., Kennedy, M., & Schmalz, M. (In Press). The Content and Context of Identity in a Digital Society. Proceedings 25th European Conference on Information Systems (ECIS 2017). Paper to be presented at 25th European Conference on Information Systems, Guimarães, Portugal, 5–10 June 2017.

Celis, C. (2015). The Machinic Temporality of Metadata. *tripleC: Communication, Capitalism & Critique*. Open Access Journal for a Global Sustainable Information Society, 13(1), 101–111.

https://doi.org/10.23106/dcmi.952137836

Chotiner, I. (2017, May 08). Has Protesting Become Too Easy? *Slate*. Retrieved June 10, 2017, from http://www.slate.com/articles/news_and_politics/interrogation/2017/05/zeynep_tufekci_author_of_twitter_and_tear_gas_on_networked_protest.html

Ciborra, C. (2002). *The Labyrinths of Information: Challenging the Wisdom of Systems*. OUP Oxford.

Coyle, K. (2005). Understanding metadata and its purpose. *The Journal of Academic Librarianship*, 31(2), 160-163.

Derrida, J. (2002). *Différance* (p. 24). Na.

Drucker, J. (2013). Performative materiality and theoretical approaches to interface. *Digital Humanities Quarterly*, 7(1).

Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication*, 11(2), 415-441.

Eyman, D. (2015). *Digital rhetoric: Theory, method, practice*. University of Michigan Press.

Fidler, B., & Acker, A. (2017). Metadata, infrastructure, and computer-mediated communication in historical perspective. *Journal of the Association for Information Science and Technology*, 68(2), 412–422.

Francisco, E. (2017, September 13) How Tinder Exposed Our Reliance on Racist Stereotypes. *Inverse Culture Magazine*. Retrieved September 16, 2017 from, http://www.inverse.com/article/36379-tinder-black-women-asian-men-racism

Furner, J. (2012). FRSAD and the Ontology of Subjects of Works. *Cataloging & Classification Quarterly*, 50(February 2014), 494–516.

Girardin, F., Calabrese, F., Dal Fiore, F., Ratti, C., & Blat, J. (2008). Digital footprinting: Uncovering tourists with user-generated content. *IEEE Pervasive computing*, 7(4).

Haraway, D. (2015). Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin. *Environmental Humanities*, 6(1), 159–165.

Harper, C. (2010). Dublin Core Metadata Initiative: beyond the element list. *Information Standards Quarterly*, 22(1), 20-28.

Hughes-Hassell, S., Bracy, P. B., & Rawson, C. H. (2017). Libraries, literacy, and African American youth: research and practice. Santa Barbara, CA: Libraries Unlimited.

Kobie, N. (2017, March 2). How to keep messages secure. *Teen Vogue.* Retrieved June 04, 2017 from http://www.teenvogue.com/story/how-to-keep-messages-secure

Kravets, D. (2017, June 2). Trump administration rolls out social media vetting of visa applicants. *Ars Technica.* Retrieved June 04, 2017, from https://arstechnica.com/tech-policy/2017/06/trump-administration-rolls-out-social-media-vetting-of-visa-applicants/

Lapôtre, R. (2017). Library Metadata on the web: the example of data.bnf.fr. *JLIS.it*, 8(3), 58-70.

Latour, B., Jensen, P., Venturini, T., Grauwin, S., & Boullier, D. (2012). 'The whole is always smaller than its parts'–a digital test of Gabriel Tardes' monads. *The British journal of sociology*, 63(4), 590-615.

Levine, D. (2015, February 12). Online dating - the psychology (and reality). *Elsevier Connect.* Retrieved June 04, 2017, from https://www.elsevier.com/connect/online-dating-the-psychology-and-reality

Lyon, D. (2014). Surveillance, Snowden, and big data: Capacities, consequences, critique. *Big Data & Society*, *1*(2), 2053951714541861

Mitchell, E., & Greenberg, J. (2009). *Metadata literacy [electronic resource] : an analysis of metadata awareness in college students*. University of North Carolina at Chapel Hill, Chapel Hill, N.C. Retrieved from http://search.lib.unc.edu/search?R=UNCb6351578

Obama, B. (2013, June 7). Statement by the President. *White House Briefing Room Statements & Releases.* Retrieved June 04, 2017, from https://obamawhitehouse.archives.gov/the-press-office/2013/06/07/statement-president

Pastva, J. and Harris, V. (2014, September 9). PunkCore: Developing an Application Profile for the Culture of Punk. Poster session presented at *International Conference on Dublin Core and Metadata Applications*, Austin, TX.

Pinkus, J. (1996, August). Foucault. Retrieved June 10, 2017, from http://www.massey.ac.nz/~alock/theory/foucault.htm

Pomerantz, J. (2015). *Metadata*. MIT Press.

Privacy International. (n.d.). Retrieved June 04, 2017, from https://www.privacyinternational.org/node/53

Raj, S. (2011). Grindring bodies: Racial and affective economies of online queer desire. Critical Race and Whiteness Studies, 7(2), 1-12.

Rieder, B. (2016). Scrutinizing an algorithmic technique: the Bayes classifier as interested reading of reality. *Information, Communication and Society*, 4462(June), 1–18.

https://doi.org/10.23106/dcmi.952137836

Shreeves, S. L., Knutson, E. M., Stvilia, B., Palmer, C. L., Twidale, M. B., & Cole, T. W. (2005). Is "quality" metadata "shareable" metadata? The implications of local metadata practices for federated collections. *Proceedings of the Twelfth National Conference of the Association of College and Research Libraries*, April 7–10, 2005. Association of College and Research Libraries, 223.

Shreeves, S. L., Riley, J., & Milewicz, L. (2006). Moving towards shareable metadata. *First Monday*, 11(8). Retrieved from http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1386/1304

Snowden, E. (2015, November 02). "Metadata" means records about your private activities and associations. It's an activity dossier. The novelty is in the lack of warrants. Retrieved June 04, 2017, from https://twitter.com/snowden/status/661302234068701188?lang=en

Spink, A., & Cole, C. (2001). Information and poverty: Information-seeking channels used by African American low-income households. Library & information science research, 23(1), 45-65.Thomas, N. (2012). *Social Computing as Social Rationality.*

Warner, J. (2010). *Human information retrieval*. MIT Press Cambridge, MA.

Zeng, M. L., & Qin, J. (2008). *Metadata*. Neal-Schuman Publishers.

Zervas, G., Proserpio, D., & Byers, J. W. (2014). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. *Journal of Marketing Research*.

https://doi.org/10.23106/dcmi.952137836