Social scholarship revisited: Changing scholarly practices in the age of social media

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Abstract

This conceptual exploration revisits a key question from earlier work (Greenhow & Gleason, 2014): What is scholarship reconsidered in the age of social media? *Social scholarship* is a framework that expanded Boyers' (1990) conceptualization of scholarship to consider how social media affect discovery and research, teaching and learning, integration, and application. This paper critically reflects on how social scholarship continues to evolve in light of changing understandings in the field of educational technology and the role social media play in the academy. We provide recent examples of social scholarship such as altmetrics, interdisciplinary projects, crowdsourced educational technology syllabi and reconsideration of the needs of research participants. Moreover, we share concrete examples of how scholars might enact social scholarship, with what benefits and challenges, and surface new concerns regarding openness, equity, access, literacy, privacy and ethical considerations. Our paper concludes with recommendations for preparing scholars to enact social scholarship while mitigating the challenges it poses.

Introduction

In 2014, scholars in the field of educational technology convened a set of contributions in this journal to explore "the state of the art regarding the development and application of digital technology-enhanced research approaches in educational research — *e-research* for education" (Markauskaite & Reimann, 2014, p. 385, emphasis added). Situated alongside articles that addressed technological changes and methodological innovations, our contribution—a model called *social scholarship* (Greenhow & Gleason, 2014)—explored "*new ways to do* research, indeed, *new ways to be* a researcher and be a scholar" in light of social media advancements (Markauskaite & Reimann, 2014, p. 386, emphasis in the original). In the intervening years, significant developments have occurred in social media in education, in scholars' identity and

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Practitioner Notes

What is already known about this topic

- Social scholarship is a model for enacting Boyer's four dimensions of scholarship—discovery, teaching, integration and application—that leverages social learning values and social media affordances.
- Social media are increasingly being taken up in the academy for professional and teaching purposes as universities encourage digital presence and public scholarship.

What this paper adds

- The paper critically (self-)examines our original model for social scholarship in light of new developments in technology, e-research methods, equity and ethical considerations, and institutional, publishing, funding, and policy shifts.
- The paper offers numerous, contemporary examples that may assist educational technology scholars in understanding how to enact social scholarship, navigating its opportunities and concerns.

Implications for practice and/or policy

- The paper concludes with advice for designing formal and informal professional learning opportunities to assist graduate students, faculty and other scholars desiring to incorporate social scholarship dimensions into work practices.

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practices, and in the institutional and societal contexts within which scholars work that warrant a closer, critical examination of this model today.

The purpose of this paper is to critically reflect on and further develop our conceptualization of social scholarship, especially how we conceive of, share and measure it; make it subject to alternate forms of review; and consider issues of equity, literacy and ethics. This work is situated within larger efforts in educational technology, towards "(self-) critical examination of the contribution that... articles can make to the field... research reports need to move away from 'victory narratives' that assume technology has a positive 'impact' and provide no empirical evidence for the added value of specific technologies" (Hennessy, Girvan, Mavrikis, Price, & Winters, 2018, p. 4). By revisiting the ways, we as scholars can use the technologies at our disposal to interact in wider circles and convene networks around scholarship, we seek to contribute to this broader conversation of *how* to provoke greater *criticality* of e-research contributions to the field.

Furthermore, the convergence of several trends make this self-critical examination of the social scholarship model important, necessary and timely. First, research within the past 5 years suggests that social media are playing a greater role in the professional development and practices of academics, impacting their work and identity (Jordan, 2014; Manca & Ranieri, 2016; Nentwick & Konig, 2014; Veletsianos, 2016), especially among junior scholars (Li & Greenhow, 2015). Second, there is growing interest in social media tools as topics of educational research, as evidenced by recent literature reviews that reveal increasing numbers of studies over the past 5 years (Greenhow & Askari, 2017; Greenhow, Galvin, Brandon, & Askari, in press; Manca & Ranieri, 2015; Rehm, Manca, Brandon, & Greenhow, in press). Third, our critical self-reflection is prompted by recent debates about the characteristics of the "shifting university," including the demise of the physical campus (Abeles, 2014), the future of academic freedom (McCluskey & Winter, 2014) and the rise of online social networks that facilitate new ways of creating, manipulating, representing and distributing knowledge—from unidirectional to bidirectional

information flows (Abeles, 2014; Greenhow & Gleason, 2015). As Abeles (2014) observed: "Historically, the university has *transmitted*...studied and validated history...Today, the concerns of society have created multiple paths for development and dissemination of research, not all linked to the academic institution (p. 101)."

Selwyn (2016) has called for more critique of educational technology, which has tended to be "discussed in enthusiastic and often exaggerated terms" (p. 1). Bigum, Johnson, and Bulfin (2015) noted this positivity extended to educational technology scholarship: "The association of... technologies with improving things is a kind of default logic... the research literature associated with ed-tech is made up of an almost unending number of studies that look for improvements in learning" (p. 5). In recent years, scholarship has shifted, seeing more scholars "expressing critical views of education and technology...challenging questions of the social, cultural, political and economic connotations of digital technology use in higher education" (Castañeda & Selwyn, 2018; Chapman & Greenhow, 2019).

Towards more critical examination of researchers' practices and their implications for contribution to the field, this paper revisits the conceptual exploration we outlined in 2014, exploring new ways to do research and be a scholar today. Next, we present recent trends in the adoption of social media in academia followed by an overview of Boyer's (1990) seminal four-dimensional scholarship model and our original reconsideration of it, which resulted in the social scholarship framework (Greenhow & Gleason, 2014). Subsequently, we provide a critical reexamination of each of these four dimensions of social scholarship in light of new developments in related research, documented cases of researchers' changing practices and policies within the last 5 years. Specifically, we critically reflect on conceptual, methodological, ethical and practical opportunities and concerns related to enacting social scholarship.

Social media in academia

In their review of the literature, Sugimoto, Work, Larivière, and Haustein (2017) found that scholars used a variety of social media, including social networking, social bookmarking, reference management, social data sharing, blogging, microblogging, and social recommending, rating, and reviewing. They concluded that "the advent...of social media, has yielded the emergence of new online tools that allow for diffusing, discussing, and organizing scholarship, as well as a new family of research indicators to measure these activities" (p. 2051). Similarly, Manca and Ranieri (2017) studied Italian academics' use of social media for scholarly communication and found that ResearchGate, Academia.edu and LinkedIn were the most commonly used platforms. LinkedIn was used primarily to extend professional networks, and ResearchGate and Academia. edu were used primarily to increase the visibility of research. Cited benefits to scholars' adoption of social media included: (a) facilitation of professional identity and greater visibility (Forkosh-Baruch & Hershkovitz, 2012; Kirkup, 2010); (b) enhancement of scholarly communication, such as disseminating published or in-progress work and tracking impact (Greenhow & Gleason, 2015; Jordan & Weller, 2018); (c) finding collaborators (Jordan & Weller, 2018); and (d) staying updated on research trends (Correia, 2012; Greenhow, Gleason, Marich, & Staudt Willet, 2017; Veletsianos, 2013). On the other hand, scholars cited tensions or concerns such as time to learn or engage in online social networking, perceived lack of utility compared to other networking opportunities like conferencing (Jordan & Weller, 2018), and social comparisons on academic social network sites like ResearchGate that fostered researcher envy or "navel-gazing:" scholars constantly self-monitoring and promoting rather than productivity and knowledge generation (Duffey & Poole, 2017; Utz & Muscanell, 2018).

Several recent studies have examined how scholars are using social media for teaching, specifically. Esteve del Valle, Gruzd, Haythornthwaite, Paulin, and Gilbert (2017) surveyed faculty regarding their teaching with social media and found a wide range of media use, including social networking sites (SNS), multimedia repositories, document sharing, wikis, microblogging, blogs, academic SNS, presentation sharing and social bookmarking. Faculty described six major purposes: (a) facilitating engagement via peer interaction and reflective learning; (b) organization for teaching via sharing by instructor and discussion; (c) reaching outside the class and learning about social media through practice; (d) enhancing student learning through supporting collaboration; (e) building a community of practice; and (f) discovery by students and instructor (Gruzd, Haythornthwaite, Paulin, Gilbert, & Esteve del Valle, 2018).

Now, scholars working in the field of educational technology are applying critical lenses to reconsider not just the impacts of technology on education or whether and how to accurately portray those impacts in the e-research literature, but how social media adoption among scholars can meaningfully impact their professional practices and prompt innovation in scholarship today. Next, we summarize Boyer's (1990) model for scholarship followed by a brief overview of our original reconsideration of it to create the *social scholarship* model (Greenhow & Gleason, 2014).

Scholarship reconsidered today: Social scholarship

In 1990, Robert Boyer published his seminal book, *Scholarship Reconsidered,* challenging established notions of scholarship as primarily research. He argued that scholars contribute knowledge in four interrelated areas to address societal needs: (a) scholarship of discovery (ie, basic research); (b) scholarship of teaching (ie, evidence-based and studied pedagogy); (c) scholarship of integration (ie, interdisciplinary team work on complex problems); and (d) scholarship of application (ie, applied scholarship).

In 2014, we explored the question: What is *scholarship reconsidered* (Boyer, 1990) in the age of social media? We conceptualized *social scholarship*—a new set of practices being debated in education (Greenhow, Robelia, & Hughes, 2009) and library sciences (Cohen, 2007). Social scholarship aims to leverage social media affordances (eg, user-generated content, promotion of users, their interrelationships) and values (eg, knowledge as co-constructed, accessible and connective) to reframe the ways in which scholarship is accomplished in academia. Cohen (2007) defined social scholarship as "the practice [...] in which the use of social tools is an integral part of the research and publishing process... [and is characterized by] openness, conversation, collaboration, access, sharing and transparent revision" (paragraph 1). Social scholars use social media to publish and interact with scholarly output and to join an online community devoted to their topic (Cohen, 2007, paragraph 4). Our conceptual exploration was situated within conversations about *open*, *digital* and *networked participatory* scholarship from an international group of authors (eg, Esposito, 2013; Veletsianos & Kimmons, 2012; Weller, 2011).

In this earlier work (Greenhow & Gleason, 2014), we reflected on each dimension of Boyer's (1990) framework, its epistemologies and practices, and then inquired how each dimension, reconsidered through the lens of social scholarship values (ie, drawn from social constructivist and connectivist theories) and social media affordances might be conceptualized and enacted, especially in the field of educational technology.

In the next four sections, we provide an overview of each of these four dimensions of our model as originally conceived: (a) social scholarship of discovery; (b) social scholarship of teaching and learning; (c) social scholarship of integration; and (d) social scholarship of application. We then engage in (self-)critical examination of each dimension, revealing conceptual, methodological, ethical or practical questions, opportunities and concerns. In the final section, we offer

recommendations to junior and senior scholars for addressing these concerns and advancing the field.

Social scholarship of discovery (SSOD)
Discovery scholarship reconsidered in light of social scholarship values and social media affordances recommends some powerful shifts. For instance, SSOD advocates a hybrid review and publishing process: research undergoes a journal's formal peer review as well as informal, social review. Informal social review using social media tools can be either *explicit* or *implicit* review. In *explicit* review, the published or in-progress work is made openly accessible, and audiences, using social media tools, are invited to critique, comment or rate it. *Implicit* review indicated by metadata (eg, profile views, document views, download numbers, favorites, retweets) can demonstrate the extent of connections the work prompted.

In critically reflecting on SSOD, we surface four previously unexplored but important opportunities and concerns that e-researchers must navigate in enacting SSOD: (a) alternative informal peer review, (b) alternative metrics and research dissemination; (c) equity issues; and (d) new dispositions, literacies and skills for participating in social scholarship. We describe each of these in turn, with examples.

Informal peer review
First, our conception of SSOD envisioned an informal peer review and dissemination process, as a complement to formal peer review, but with little critical examination (Greenhow & Gleason, 2014). Several scholars have since experienced and studied informal post-publication review on social media, including its benefits and drawbacks (LaCour & Green, 2014; Woolston, 2015; Yeo *et al.*, 2017). Typically, peer-refereed publications go through a formal review process whereby knowledge is validated; editors and reviewers, mostly from institutions of higher education, evaluate the quality and contribution of an author's work. Reviewers serve as gatekeepers, controlling the flow of knowledge. However, formal peer review can be flawed: researcher bias, failure to detect flawed data or designs, variable quality or slow speed of reviews, and lack of transparency can contribute to publication of low-quality or invalid research and the need for alternate review forms (Yeo *et al.*, 2017). Informal post-publication reviews, through social media such as blogs, Twitter and ResearchGate have been growing (Knoepfler, 2015). Researchers, nonexperts and journalists are engaging in dialog on social media, providing a new means whereby research can be critiqued, which some have argued is generating new models of public engagement with science (Kouper, 2010).

As one illustrative case, Yeo and colleagues (2017) investigated the role of Twitter and blogs in pre- and post-publication review through a case study of the #arseniclife controversy on Twitter. They explored how tweets indicated skeptical and non-skeptical views of a scientific article that claimed bacteria could replace phosphorus for arsenic in its genetic material (see Wolfe-Simon *et al.*, 2010). To back up their skepticism, Twitter users involved in the #arseniclife conversation tweeted links to critiques and studies refuting the claim, which were published on blogs before publication in traditional academic outlets. Ultimately, the arsenic life hypothesis was refuted and dismissed with the open access publication of a study by one academic blogger.

Concerns with informal review are that nonspecialists, journalists and social media influencers (ie, those with large followings) can shape conversation in misleading or unwarranted ways, all within public view. On the other hand, advantages of informal review, as a complement to formal peer review, are its transparency and openness, allowing a wider, heterogeneous audience of interested people to observe, participate, become informed, raise attention, sustain the dialog, mobilize and confirm results or surface inaccuracies (Yeo *et al.*, 2017). If educational technology

has been largely shaped by what Bernstein (2000) called *horizontal discourse*—the everyday, oral, local and context-dependent modes of communication—than this discourse is also essential for the future of educational technology design and research.

The rise of platforms like Publons (http://publons.com) offer a middle ground between public, informal review and blind, peer review. Publons, a free service, is used by more than 500 000 academics across 25 000 journals, according to its website, to perform pre- and post-publication reviews and enable scholars to track their impact as a peer reviewer, cited author and journal editor, all in one place. Publons integrates with ORCID—a registry of unique identifiers for scholars, ie, open, mobile, transparent and community-based (orcid.org) —and with traditional citation databases (eg, SCOPUS, Web of Science) and leading journal publishers (eg, Sage). Professional activity on Publons is tagged with a personal profile, and the service records, verifies and showcases one's peer review and editorial contributions, which, according to the site, has been shown to increase review invitation acceptance rates and decrease review turnaround time. Similarly, ORCID links a scholar's unique identity with her research outputs and professional activities (data sets, books, journal articles, news stories and patents) ensuring that her work is recognized.

Alternative metrics

Second, although our original article (Greenhow & Gleason, 2014) alluded to alternative ways of measuring the reach and impact of SSOD, more recent work has debated *altmetrics* (ie, alternative metrics) as indicators and measures of the societal impact and relevance of academic research. Altmetrics "track and demonstrate the reach and influence of research" through social media (Cochrane, Redmond, & Corrin, 2018, p. iv) with measures such as PDF downloads, HTML pageviews, Facebook shares, Twitter mentions and Wikipedia cites (Priem, Piwowar, & Hemminger, 2012). Altmetrics seek to measure impact—of a specific article, not its journal (Priem, Taraborelli, Groth, & Neylon, 2010)—by assigning a numerical score derived from the combination of mentions of a specific article across social media platforms (Cochrane *et al.*, 2018). Proponents of altmetrics describe these measures as functioning similarly to how we first described SSOD (Greenhow & Gleason, 2014): creating "real-time recommendation and collaborative filtering systems" and enabling rapid, crowdsourced peer review—"an article's impact might be assessed by thousands of conversations and bookmarks in a week" (Priem *et al.*, 2010).

Ye and Na (2018) describe altmetrics as solutions to flaws in traditional impact assessments: taking the most recent publications and various formats not limited to written works into account, then aggregating these measures to reflect the achievements of researchers. Priem and colleagues (2010), founders of altmetrics.com, argued that scholarship's three main traditional filters for importance—peer review, citation counting measures and journal impact factor—are failing, and they proposed altmetrics as a solution.

Traditional measures of research impact have received numerous critiques, such as equating journal rank with a prediction of research quality: "Incentives to publish in high-ranking journals...encourage scientists to be less cautious in their conclusions (or worse), in an attempt to market their research to the top journals" (Brembs, Button, & Munafò, 2013, p. 7). Journal impact factors misdirect from the reality that "articles without any impact may be published in highly ranked journals or journals with high impact factor, whereas articles with high impact could be published in lower ranked journals or journals with low impact factors" (Gruber, 2014, p. 173). McPeek (2012), former Editor-in-Chief of the *American Naturalist* journal, wrote a blog post detailing ways authors and editors artificially—and unethically—increase journal impact scores, such as by publishing review and methods articles or requiring authors to cite recent articles from the same journal.

In terms of rating author impact, the *h-index*—a metric that seeks to measure the productivity and citation impact of a scholar's publications based on his or her most cited papers and the number of citations they have received—has been used in an attempt "to provide a better measure of research quality than merely a count of publication numbers or citation counts alone" (Cochrane *et al.*, 2018, p. ii). This measure, too, is limited:

...it does not (a) take into account the number of authors per publication or their order, (b) consider the years of activity of each given scholar/journal, (c) take into consideration the scientific field of each given work/journal and finally (d) control for bias due to the effect of self-citations (Ferrara & Romero, 2013, p. 2333).

In response, Ferrara and Romero (2013) proposed a new measure, the *dh-index*, which is based on the h-index but decreases the weight of self-citations in the computation of the impact of a given author or journal.

Altmetrics, like traditional metrics of scholarly impact, have their own drawbacks such as difficulty distinguishing between a measure of impact versus a measure of attention—especially when Twitter *retweets* and Facebook *likes* can be easily bought (Colquhoun, 2014; Davis, 2012). Haustein (2018) argued that "motivations to cite or not cite certain sources are biased and influenced by many factors other than a paper's significance; not every citation represents impact" (p. 32), such as known biases towards the US and the UK. In addition, citations appear and drop off very shortly after an article's publication, and most social media activity related to new articles probably stems from stakeholders in academia, "more likely to reflect scholarly communication rather than societal impact" (Haustein, 2018, p. 31).

Given the weaknesses of both traditional measures of impact and altmetrics, a combined approach seems more reasonable. Certainly, the pressure to demonstrate the impact of research has not subsided, as funders and employers request metrics—including altmetrics—of scholarly impact (Colquhoun, 2014; Haustein, 2018). From their study of academic articles in the field of psychology, Ye and Na (2018) concluded that neither traditional metrics (eg, citation counts) nor altmetrics (eg, likes, views, shares) "perfectly reflect academic or other impacts of articles" and should be thought of as complementary data (p. 1078); both are needed for a complete picture (Priem *et al.*, 2012).

As alluded to earlier, evolving scholarly practices and metrics, intertwined with social media, have real, sometimes negative, impact on academics. Van Noorden (2014) reported that scholars found ResearchGate to be stressful, and Grande and colleagues (2014) found that "health policy researchers rated social media as the poorest dissemination method, describing it as being 'incompatible with research, of high risk professionally, of uncertain efficacy, and an unfamiliar technology that they did not know how to use'" (as cited in Sugimoto *et al.*, 2017, p. 2038).

Equity issues

Thus, despite optimistic views that widely available and popular social media will democratize access to educational opportunities and educational research, inequities persist that challenge such optimism. SSOD may advantage certain scholars over others. Indeed, in our original conception (Greenhow & Gleason, 2014) we neglected to consider how different groups of researchers might experience online spaces generally, and social media spaces in particular, very differently. These experiences, in turn, can influence not only the explicit and implicit review process, but also researchers' self-confidence and their ability to engage in online spaces. For instance, women are twice as likely as men to be sexually harassed online and more likely to experience online harassment generally than are their male counterparts (Reid, 2016; Duggan, 2017); Cassidy, Faucher, and Jackson (2014) surveyed faculty in Canada

and found that 22% of female faculty reported experiencing online harassment, compared to only 6% of male faculty. Online harassment can lead to various forms of coping by the person who experiences it. Veletsianos, Houlden, Hodson, and Gosse (2018) found that women scholars who had undergone some form of online harassment used coping strategies to reduce their exposure to harassment, such as avoiding certain social media, increasing security settings, self-censorship or being silent online, essentially taking their voices out of the online conversation.

Thus, we need to understand demographic differences in social media participation to understand who may be excluded where scholars choose to share their work. Historically, when technologies like the Internet are integrated into people's lives, differential uses among high- and low-socio-economic status (SES) households and schools, perpetuate inequities (Dolan, 2016; Hargittai & Hsieh, 2013; Kimmons, Carpenter, Veletsianos, & Krutka, 2018; Warschauer & Matuchiak, 2010). For instance, Kimmons and colleagues (2018) used data mining of over 8000 public K-12 institutional Twitter accounts in the US to determine participation differences between schools based on demographics, with institutions in wealthy, populated regions more likely to adopt Twitter than were institutions in poor, rural areas. Hargittai and Hsieh (2013) documented digital divides along two levels: first, differential access to the Internet and social media among different population segments, and second differentiated skills and uses among demographic groups and by socio-economic status, with people from low-income contexts less likely to have Internet use skills and social supports than their upper-to-middle income peers.

New literacies, dispositions or skills

A fourth and related concern with SSOD is that it assumes scholars' have Internet use skills and digital literacies but these are not randomly distributed as systemic, structural inequalities persist. Our original conception of SSOD discussed published research as texts, linked to and shared via social media. However, social media enables sharing and dissemination of research through various media: text, images, video, and sound. In fact, e-research journals like this one encourage authors to link their articles to interactive multimedia material. Other journals like *Teachers College Record* urge authors to participate in *vialogues* (Natriello, 2017), where short videos on published articles are created and shared, like movie trailers, to grow audiences and spark provocative discussions. To take full advantage of the multimedia affordances of social media, researchers must possess certain competencies such as new literacies, or the dynamic and situationally specific strategies, skills, social practices and dispositions required by the Internet and social media (Coiro *et al.*, 2008, p. 14; Mills, 2010). Similarly, Rheingold (2014) argued that to be "net smart" individuals need literacies related to mindfulness, critical evaluation of information, participation strategies, collaboration and network awareness (Krutka *et al.*, in press).

Conceptually, these dispositions (towards resource sharing via creative, circulatory and collaborative practices) present opportunities for mobilizing practices (Gleason, 2018a), seen as people on social media like Twitter invite peer participation in a spontaneous, quotidian event. These practices are endemic to Twitter and evidenced through in-the-moment joint activity, such as live-tweeting an academic talk. By inviting networked participation, centered on mutual interests, and facilitated by relational affinity and connection, social media users are able to mobilize their contacts to partake in co-constructed narratives, contribute and circulate information, and creatively remix and remake experiences. Mobilizing practices align with Bernstein's (2000) notion of horizontal discourse, ie, shaping e-research (Castañeda & Selwyn, 2018, p. 1). A critique, though, is that these new dispositions, literacies and skills assumed in social scholarship are not equally distributed, even in the field of educational technology.

Social scholarship of teaching (SSOTL)

Building on Boyer's (1990) model, the social scholarship of teaching leverages the possibilities afforded by social media-enabled tools, platforms and communities of practice to enrich and expand the study and iterative refinement of teaching for learners and teachers alike. Instructors can broaden classroom contexts by incorporating experts, practitioners, parents, administrators and others into the learning space, co-constructing knowledge in joint practice. Teaching is further refined through an iterative design process, in which feedback—from learners, peripheral participants and other instructors—leads to changes in course content, pedagogy and research questions that closely match classroom activities. SSOTL scholars are pushing the theory and practice of Boyer's (1990) SOTL, encouraging diverse publics not just to integrate social media into pedagogy, but design and assess it for social learning.

As a recent example of SSOTL, a group of social scholars have been co-creating a #SocialMediaSyllabus for use in higher education. Through the production of a formal course syllabus, which can be adapted as needed to fit specific teaching and learning contexts, we are attempting to create an inclusive working group of teacher-scholars who are engaged by the possibilities (and perils) of integrating social media into education. This course addresses several challenging issues that educators face as social media takes root in society—Does social media undermine democracy? How is it changing who we are? What are some effects on learning and development? The course is organized around three major areas—individual, society and education and offers concrete guidance on how to conceptualize, integrate and evaluate social media for teaching and learning purposes in higher education. Using social media affordances, we will make this document public, soliciting feedback from colleagues working in this area and studying the collaboration process and outcomes.

Similarly, Literacy, Equity and Remarkable Notes (LEARN) aims to create a nationwide social learning effort focused on the intersection of literacy and equity. Through the use of a hashtag, #MarginalSyllabus, and the social annotation platform, Hypothes.is, LEARN aims to spark conversation about literacy and equity issues through the reading of shared texts, annotation and public conversation. These shared texts are academic articles designed to educate and inform readers about important issues such as trauma and healing in the classroom, the lives and literacies of students of color, centering student voice, and creating learning spaces that facilitate social justice, well-being, and student success. Readers are encouraged to participate in this social annotation of articles online. The first article (Garcia & Dutro, 2018) invited readers to think about how to respond to emotional trauma as a result of 2016 presidential campaign rhetoric. Participants included links to resources (ie, articles they have authored), multimodal graphics and references to materials for a "deeper dive." These annotations provide multiple ways to contribute to a collective learning experience (eg, through textual response, personal experience, rhetorical response, intertextual connection, and more) and become the site for research on teaching.

As these examples illustrate, SSOTL can invite collaboration, social learning and the development of new connections. On the other hand, it preferences teacher-scholars who espouse certain theoretical orientations (eg,constructivist, connectivist, sociocultural) and facilitative, collaborative versus didactic teaching styles.

Social scholarship of integration (SSOI)

Practicing social scholarship of integration, e-researchers and collaborators use complex tools, emerging research methods (eg, social network analysis), and research teams to investigate interdisciplinary problems. Calls for methodological capacity building in the field of educational technology (Haßler, Major, & Hennessy, 2015)—especially to prepare for work with large, digital

data sets (Bulfin, Henderson, Johnson, & Selwyn, 2014)—make practicing SSOI, with its exposure to different research traditions and cultures, even more timely. This dimension of scholarship posits that social problems require the collective efforts of a team—often using methods borrowed from computer science and increasingly influenced by biomedical and public health approaches grounded in epidemiology. An epidemiological approach attempts to explore the spread of particular social behaviors (eg, in educational research, information or ideas) by locating the key influencers. Fresno García, Daly, and Segado Sánchez-Cabezudo (2016) explained that social network analysis aims to examine: "how seemingly autonomous individuals and organizations are, in fact, embedded in social relations and interactions that have consequences for individual and collective behaviors" (p. 24). Their study of the diffusion—of ideas, of disease, of information—is particularly interested in the shape of the overall social media network, the key influencers in this network, the relationships between individuals in the network and the features that make this diffusion effective (ie, the virality of a particular idea). Fresno García and colleagues (2016) reported that, unlike simply measuring the number of followers or friends, social network analysis can uncover influencers, those people who broker information through their socially connected status; these influencers "may amass resources, such as attention, knowledge, or information, and may have increased influence over the way those resources are disseminated across a network" (p. 35). The authors found that, in order for ideas to spread throughout the network, key influencers only needed to account for 1–2% of the total population of the network.

Social scholarship of integration envisions large digital data sets to investigate complex social challenges, such as educational reform in the US, but again, this vision preferences scholars with digital and methodological literacies. In the #CommonCore (CC) project, scholars aimed to understand the way that political debate is occurring on Twitter by investigating its "substance, sophistication, and strategy" (Supovitz, Kolouch, Daley, & Del Fresno, 2017). This project amassed 1 million tweets on the controversial American educational reform initiative known as the Common Core, which introduced state standards and assessment by doling out substantial federal education funding to the states aligned with this effort. Building on earlier research, this work investigated the structural dynamics of the #CommonCore discussion, the type of rhetorical framing of the issues (ie, through lexical and semantic analysis), and how (or whether) this type of conversation can lead to becoming informed. Supovitz and colleagues (2017) found that a broad range of people contributed to this discussion, noting that those outside the field of education often wielded outsized influence in the conversation. The use of big data to explore discussion of the Common Core State Standards also revealed interesting paradoxes about enacting SSOI. Despite opportunities to learn about diverse perspectives on an important, complex topic, data revealed little interaction between the diverse groups. This may lead to a situation where social media may facilitate interdisciplinary conversation, but social and cultural imperatives hinder interactions among those who hold different perspectives (Krutka *et al.*, in press).

Social scholarship of application (SSOA)
Over the past 5 years, our conception of the dimensions of social scholarship of application has changed. Earlier, we conceptualized "application" traditionally, envisioning scholarship from a mainly epistemological perspective, focusing on how digitally mediated processes and practices may support the development of new knowledge through its co-construction with various stakeholders (Greenhow & Gleason, 2014). We continue to be encouraged by scholarship that links theory and practice, especially design-based research that serves broader social, cultural and economic needs, such as the Design Justice Network, Hive Research Lab and others. We see these

design-based research initiatives pushing educational researchers, practitioners and designers to consider, in addition to epistemological perspectives, the methodological, ethical and ontological dimensions of SSOA. In short, before social scholars interested in applied scholarship can address intractable social problems, such as transforming education or addressing climate change, they need to consider how the design of research practices and processes can serve societal needs by infusing equity and justice into the work.

Furthermore, methodological concerns with enacting SSOA include both the strategy of social media research (eg, that Twitter is convenient, can supply large data sets, and is more accessible than Facebook) and the tactics of Twitter research (eg, the hashtag as central phenomenon of interest, which may obscure many other interesting phenomena, such as when conversations occur around a topic but neglect to use the hashtag). Tufekci (2014) noted that hashtag analysis can provide "useful glimpses" into complex, sociocultural phenomena, but that these analyses should be paired with "thorough discussion of the culture surrounding the specific hashtag, and analyzed with careful consideration of selection and sampling biases" (p. 4). Tufekci noted that social media methods, especially those that solely use quantitative analysis, are susceptible to superficial interpretation. Consider the case of #gezi, corresponding to the uprising in Turkey, which dropped precipitously from 5 million tweets to 2 million tweets in a matter of weeks. Rather than suggesting a diminished interest in the uprising, or that the protests had stopped, Tufekci reported that the sociotechnical practices of social media activism had changed. Rather than wasting characters to include #gezi, activists had omitted the hashtag, while still using the platform for larger social, cultural and political purposes. This example underscores that social media can be conceived of as multidimensional, multilevel systems (Manca, 2018); they afford and constrain certain scholarly practices and academic identity as the result of intersecting political, economic and techno-cultural views embedded in these platforms (Krutka *et al.*, in press; Manca, 2018).

For at least the past two decades, Internet researchers in various fields have attempted to map the complex relationship between emerging research methods and ethical implications of their work, with an eye towards justice, beneficence and respect for persons (Buchanan, 2017, in Kinder-Kurlanda and Zimmer, 2017; Fiesler & Proferes, 2018). The era of big data, although bringing new affordances for research integration, such as large-scale research collaborations like #CommonCore, also raises challenging constraints for research participants. For example, power disparities between researchers and participants may lead to data misappropriation or nonconsensual data collection (Buchanan, 2017, p. xxxii), leading to potential privacy violations for participants. Fiesler and Proferes (2018) found that over 60% of Twitter users in their survey study were unaware that their data might be used for research purposes. In addition, they found that over 40% of Twitter users incorrectly surmised that Twitter terms of service (TOS) protected users from nonconsensual data collection; in fact, Twitter TOS explicitly acknowledge that Twitter data may be accessed by researchers. Although those surveyed noted that there were numerous contextual factors that may change how they feel about their data being included in a study, including the size of the data set, the publication of tweets verbatim and being informed prior to Twitter activity, the findings as a whole suggest that although e-researchers may not violate Twitter TOS by accessing user data, ethical research methods warrant taking additional precautions to protect users.

Ethical research methods—a topic underexplored in the educational technology literature (Moore & Ellsworth, 2014)—designed to protect the privacy of participants, contribute to both the development of theory about what scholarship is and its essential practices (Gleason, 2018a; 2018b; Gleason & Von Gillern, 2018). Methods should adhere to ethical guidelines for informed consent,

protecting privacy and dissemination of research. They should include talking with participants at the beginning of research about publication and working with them throughout to contribute to the "trustworthiness" of research findings (Lincoln & Guba, 1985; Schwandt, Lincoln, & Guba, 2007). These practices align well with the recommendations suggested by Fiesler and Proferes (2018), who proposed that researcher methodological considerations should include asking for permission before using social media content in research publications, giving participants the opportunity for "privacy through obscurity" by disguising their social media content (ie, rather than quoting their tweets verbatim), and pooling participant data to explore general themes, rather than focusing on individual-level activity.

In addition to methodological and ethical concerns of performing social scholarship of application, we suggest that there are ontological considerations that emerge through this work. Social scholarship is more than just the co-construction of knowledge through social learning technologies. Through this participatory process, scholars can transform their identities, and the world (or at least their network) through their networked activity. In part, this ontological transformation, according to Krutka, Asino, and Haselwood (2018), has occurred as teacher-activists take to Twitter to mobilize a collective response to dire working conditions. Through connected activities (eg, through the #OklaEd hashtag and through organized events, such as a statewide walk-out), teachers working alongside researchers have "signaled their power to alter narratives, cause disruption, and effect some desired legislative change" (p. 389). Indeed, Krutka and colleagues (2018) noted these events facilitated individual and societal change; as individual teachers reaped the benefits of their collective network, many were motivated to work for even greater change by running for political office. This willingness to make change suggests that one way social media may transform scholarship practices is through the degree to which people are willing to undertake identity work in public. We may be past a point where scholarly identities are clearly left at the university office or classroom door; in this new context, social media spurs the integration of multiple identities through networked participation.

Our conception of social scholarship of application has expanded beyond epistemological concerns to consider how e-research as a field must address methodological, ethical and ontological dimensions of its work. Putting these dimensions in conversation means an explicit focus on equitable processes and practices that acknowledge both the affordances and constraints of social scholarship. From a methodological perspective, this may mean complementing social media data with additional data sets that make up for this "blindspot." From an ethical perspective, this means balancing tensions between participant expectations and cultural norms of Internet users (ie, the ethical responsibility to protect participants), and research methods permitted by platforms and institutional review boards. From an ontological perspective, social scholarship of application means recognizing that our participation in social media spaces may facilitate or require larger identity transformations.

Discussion and conclusions

This paper critically examined social scholarship, a four-dimensional model for enacting scholarship today facilitated by social learning values and social media affordance. Reflecting on new developments in related research, documented cases of researchers' changing practices and institutional shifts within the last 5 years, we identified conceptual, methodological, equity, ethical and practical opportunities and concerns that doing social scholarship generates. For junior and senior scholars who seek to incorporate social scholarship as a complement to traditional models, and as one approach within the open, digital and networked participatory scholarship movement, we offer the following recommendations.

First, although scholars and their institutions may be receptive, encouraging their faculties' digital presence and public scholarship (Veletsianos, 2016), even offering workshops and fellowships, professional learning opportunities on this topic should go beyond Internet and social media skills training to include examination of the ways various groups are targeted on social media. Online harassment affects scholars differently and the universities and societies they aim to serve. Professional development should identify trends in harassment and bullying by gender, race, sexuality and more, offer strategies for coping and mitigating these incidents (Veletsianos & Moe, 2017), and provide institutional resources, such as investigation and reporting structures.

Second, as open data initiatives take hold in publishing circles, with many major journals (eg, BJET, journals of the American Educational Research Association) and funding agencies encouraging or requiring open access to data as accompaniments to research articles, increasing numbers of scholars may embrace transparent, open, informal peer review. However, scholars will need training in how to organize, display and share data publicly as academic norms evolve and additional data privacy concerns surface.

Third, training of e-researchers in doctoral programs, which typically emphasize original, individual discovery scholarship, should include an orientation to the four dimensions of scholarship. It should include consideration of the relational quality of this work: the interdependence of people in mutual recognition and participants' privacy protections as key for the sustainability of the whole enterprise. Social scholars must consider, inform and protect research participants in social learning spaces, so that the scholarship is valid, ethical and robust. Also, they ought to contribute to theory and practice of performing social scholarship, including best practices in navigating the concerns and challenges outlined above.

Fourth, to develop teacher-scholars, instructors should model evidence-based approaches to teaching, demonstrate transparency in systematically studying pedagogy, and critically reflect on the advantages and challenges to SSOTL with students. Ultimately, to be a public, social scholar will take scholarship capacity building through formal and informal forms of professional learning, including that which can be facilitated by social media (Greenhow *et al.*, 2017; Greenhow, Cho, Dennen, & Fishman, in press; Macià & García, 2016, 2017).

Statements on open data, ethics and conflict of interest

There is no conflict of interest. This work does not deal with commercial products.

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