



Networked Participatory Scholarship: Emergent techno-cultural pressures toward open and digital scholarship in online networks

George Veletsianos*, Royce Kimmons

University of Texas at Austin, United States

ARTICLE INFO

Article history:

Received 9 July 2011
Received in revised form
20 September 2011
Accepted 2 October 2011

Keywords:

Networked Participatory Scholarship
Digital scholarship
Open scholarship
Online networks
Social media
Techno-cultural pressures

ABSTRACT

We examine the relationship between scholarly practice and participatory technologies and explore how such technologies invite and reflect the emergence of a new form of scholarship that we call *Networked Participatory Scholarship*: scholars' participation in online social networks to share, reflect upon, critique, improve, validate, and otherwise develop their scholarship. We discuss emergent techno-cultural pressures that may influence higher education scholars to reconsider some of the foundational principles upon which scholarship has been established due to the limitations of a pre-digital world, and delineate how scholarship itself is changing with the emergence of certain tools, social behaviors, and cultural expectations associated with participatory technologies.

© 2011 Elsevier Ltd. All rights reserved.

1. Introduction

The last thirty years have seen an explosion of information and communication technologies that have impacted diverse aspects of our lives. For instance, the financial, medical, travel, and publishing industries have seen great advancements in how business is conducted on a day-to-day basis, in large part as a result of technological innovations. The higher education sector has not been immune to such innovations. The development of the contemporary university is intertwined with the development of technology and other aspects of society reflecting a rich history of interaction between the institution, society, and available technology tools (Alexander, 2007; Rhoads & Liu, 2009; Siemens & Matheos, 2010), lending credence to the notion that just as societies, governments, and other social groups adapt and change over time, so too do universities, the work that they do, and how they do that work.

In this paper, we examine the relationship between scholarly practice and technology and explore how online social networks invite emergence of a new form of scholarship that we call *Networked Participatory Scholarship*. Questions relevant to this investigation are: What does the participatory Web mean for scholarship? What is the relationship between technology and scholarly practice? Are scholars engaging in scholarly digital practices merely as a result of opportunities presented by contemporary forms of technology? Is technology simply an outlet through which scholars enact scholarly practices that they value? We provide a conceptual map for thinking about these questions through an examination of digital scholarship, the historical relationship between technology and scholarship, and emergent techno-cultural pressures that may lead scholars to reconsider some of the foundational principles upon which scholarship has been established due to the limitations of a pre-digital world. We focus on higher education stakeholders and specifically the educational scholar. Any reference to the term *scholar* should be understood to refer to individuals who participate in teaching and/or research endeavors (e.g., doctoral students, faculty members, instructors, and researchers).

While the term *scholarship*, may traditionally be perceived as referring to scientific discovery, any reference to the term in this paper should be understood to include both teaching and research activities (Boyer, 1990; Hutchings & Shulman, 1999). This view of scholarship was originally proposed by Boyer (1990) whose empirical evaluation of scholars' activities in higher education led him to argue that this

* Corresponding author.

E-mail address: veletsianos@gmail.com (G. Veletsianos).

perspective better describes the types of activities that scholars engage with because knowledge is generated and acquired not just through research, but through teaching as well. This perspective has been gaining increasing acceptance both among individuals studying digital scholarship (e.g., Pearce, Weller, Scanlon, & Kinsley, 2010) and education researchers (e.g., Foster et al., 2010). *Scholarly practice* on the other hand, should be taken to refer to those activities undertaken by scholars for teaching and research purposes. Unsworth (2000) suggests that scholars engage in “scholarly primitives” that are common across disciplines, and these are the practices of discovering, annotating, comparing, referring, sampling, illustrating, and representing, while Palmer, Teffeau, and Pirmann (2009) suggest that scholars engage in the activities of searching, collecting, reading, writing and collaborating. Beyond these specific activities, Boyer (1990) summarizes scholarly practice in terms of the scholarship of discovery, the scholarship of integration, the scholarship of application, and the scholarship of teaching.

The relationship between technology and scholarship has not attracted much empirical attention in the education literature (Greenhow, Robelia, & Hughes, 2009; Veletsianos, in press). Yet, Kumashiro et al. (2005, p. 276) warned the education community that “technological changes are going to flood how we currently think about, do, and represent research... although [this issue] is being largely ignored in colleges of education, other than in simplistic and trivial ways... [and] most education faculty have no real sense of this inevitable change”. Examples of the use of technology in scholarship vary widely. Commonplace practices include the use of bibliographic management software, data analysis tools, and transcription services to aid efficiency. Scholars may also publish in online journals and self-archive their publications on personal or institutional websites, use web logs (blogs) to share instructional materials with colleagues (Martindale & Wiley, 2005), employ microblogs to network with diverse audiences (Veletsianos, in press), use social networking sites to publicly reflect on in-progress manuscripts (e.g., Conole, 2011), release instructional content free-of-charge through Open CourseWare initiatives (Pearce et al., 2010) and collect artifacts from distributed Internet contributors (Wesch, 2011).

While adoption of any technology varies according to numerous variables (e.g., perceived value to professional endeavors, familiarity with the technology, etc.), a number of technological and cultural stimuli have encouraged at least some faculty to utilize participatory technologies and online social networks for scholarly purposes. To understand these stimuli, and the forms of scholarship emerging from them, we will first discuss how prior literature has formulated the role that digital technologies play in scholarly work and how these formulations lead to a transformed understanding of scholarship that is both networked and participatory. We will then show that this transformation is not without precedent by delineating the negotiated relationship that technology and scholarship have historically had with one another, wherein technological innovation and cultural norms have shaped scholarship in a variety of ways. We will conclude by examining current and emerging techno-cultural pressures on scholarly practice that arise in the dominant culture, amongst scholars, and within scholarly journals to understand how these pressures will continue to transform scholarship in ways that are both networked and participatory.

2. From digital scholarship to Networked Participatory Scholarship

Over the past few years, there has been growing interest in “digital scholarship” as some scholars have sought to use technology to enhance their research, typically in hopes of making it accessible faster and cheaper (Andersen, 2003). A number of researchers have also noted the value of technology in fostering scholarship that is social (Berge & Collins, 1995; Chong, 2010; Cohen, 2007; Greenhow, 2009), conversational (Oblinger, 2010), and open (Pearce et al., 2010). Cohen (2007, ¶ 1) notes that social scholarship “is 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”. Pearce et al. (2010) argue that digital scholarship is “more than just using information and communication technologies to research, teach and collaborate, but it is embracing the open values, ideology and potential of technologies born of peer-to-peer networking and wiki ways of working in order to benefit both the academy and society.” While Cohen considers scholarship to refer to the process of academic research, Greenhow, Pearce et al., and the authors of this paper consider scholarly practice to include teaching endeavors.

Researchers have also attempted to characterize the individuals that employ digital tools in their scholarship (Burton, 2009; Cohen, 2007; Weller, 2009) and have described these scholars in a variety of ways (e.g., social scholars, open scholars, digital scholars, etc.). Though individual authors’ definitions may vary slightly from one another depending upon the scholar behaviors they are emphasizing, such definitions tend to focus on a few common components, including technology, collaboration, sharing, and openness. For example, Cohen presents a list of fourteen characteristics that describe social scholars (e.g., “a social scholar initiates or joins an online community devoted to her topic, using any of a number of social software services or tools,” ¶ 4). Burton argues that “the Open Scholar is someone who makes their intellectual projects and processes digitally visible and who invites and encourages ongoing criticism of their work and secondary uses of any or all parts of it—at any stage of its development” (¶ 5). Weller summarizes the digital scholar as someone who is “open, digital, & networked” (¶ 4). The visions presented for these kinds of scholars contrast to the dominant conceptualization of scholarly practices which are often seen as monastic and lacking ongoing participation, support, and conversation (Kumashiro et al., 2005). While it could be argued that scholars have always shared their work with colleagues (e.g., face-to-face, via correspondence, over the telephone, through conferences, etc), and disciplines have always had open (and less open) scholars, questions that we need to consider are: How are the (ongoing and new) needs and values of educational scholars supported by new technologies and participatory practices? Conversely, how do current conceptualizations of scholarly practice and online participation hinder our scholarly goals? And how do online networks, and the ability to have instant and continuous access to networks of colleagues, impact the way that we research and teach?

Attempts at using technology to enhance scholarly practice have so far been met with skepticism and reluctance, as departmental requirements for tenure and promotion in institutions of higher education remain unchanged (Ayers, 2004; Kiernan, 2000; Purdy & Walker, 2010). For many faculty members, then, the potential value of “going digital” has not been worth risking tenure and departmental stigma (Ayers, ¶ 18). Though scholars and their universities may generally look upon digital scholarship with a receptive air (Andersen, 2003; Kiernan, 2000), departmental acceptance has been found to vary by discipline, with the hard sciences being the most receptive, followed by the social sciences and the humanities (Andersen, p. 18). The reason for such differing levels of acceptance may largely be due to what is being done by scholars in the current formulation of digital scholarship. As Borgman (2007) points out, much of the effect that digitization has had upon scholarship revolves around the blurring of primary and secondary sources, wherein primary sources (i.e., data

sets) are made more widely available to researchers in the form of publications and are more widely being listed on curriculum vitae. In the hard sciences, it is generally suggested that making data sets more widely available would have great value. For instance, providing access to genome mapping data may offer large societal benefits because multiple research teams can analyze such data concurrently. Within the education and social sciences, however, such motivations for collaboration may be of less interest (cf. Thagard, 1997). Additionally, the publication and dissemination of secondary sources via digitization is much more problematic, as academia lacks an established framework of evaluation for judging the legitimacy or quality of interpretive or positional work that is distributed via non-traditional channels, such as videos on file-sharing sites or multimedia narratives (cf. Borgman, 2007; Purdy & Walker, 2010). Such a framework would need to consider complex aspects of digital publication such as time invested, originality, transferability, impact, peer judgments, and usefulness to the field and to society (Andersen, 2003; Kiernan, 2000) and has yet to evolve. As a result, digital scholarship lacks appeal for scholars in the social sciences.

When considered through another lens, both the value *and* limitation of digital scholarship may lie in its framing of technology through a lens of amplification. Thus, fields that require mass data collection and access have much to gain from the approach, while fields which rely more upon positionality and interpretation of theory (in addition to data) may find that digital tools which focus on improving data sharing do not help them drastically improve existing practice. However, if we consider that technology may replicate, amplify, or transform scholarly practice depending on how it is used (cf. Hughes, Thomas, & Scharber, 2006; King, 2002) then we can begin to see that technology may have untapped potential in that it may not just improve what it is we are already doing, but, rather, it may actually *transform* our scholarly practice in positive ways.

Thus, we view how scholars use digital technologies to support scholarship as including a set of practices and dispositions that have the potential to fundamentally alter the way we view scholarship. We define these practices as *Networked Participatory Scholarship* (NPS) and consider them to go beyond digital scholarship in both scope and value. Networked Participatory Scholarship is the emergent practice of scholars' use of participatory technologies and online social networks to share, reflect upon, critique, improve, validate, and further their scholarship. Though this practice is at an early stage of adoption and development within the scholarly community, one can find examples of it in public online networks. Such networks include social media sites appropriated and repurposed to fit scholarly objectives (Veletsianos, 2010; Veletsianos, *in press*) or social networking sites specifically targeting scholars. Examples of the former include video-sharing sites (e.g., YouTube), micro-blogging and social networking services (e.g., Twitter), question-answering services (e.g., Quora), and blogs, and specific instances of scholarly use include: Semingson (2011) who has recorded and shared a selection of her reading and literacy lectures on YouTube and Conole (2011) who shared in-progress drafts of her book and received comments and feedback from colleagues on its content. Examples of the latter include environments such as Academia.edu, Cloudworks, and Mendeley, and specific instances of scholarly use include the use of Mendeley by the Language Learning and Social Media Project (2011) to develop an open bibliography enabling distributed individuals to share manuscripts related to a topic of shared interest. It is important to note here that, while some of these networks might be designed with specific uses in mind (e.g., Twitter as an information-sharing tool), individual scholars might use them in unanticipated ways. For example, Veletsianos (*in press*) notes that non-scholarly social interaction on Twitter provides opportunities for discovering shared interests and igniting opportunities for scholarly collaboration.

Understanding the historical relationship between technology and scholarship, and the emerging stimuli that exert pressure on scholarship, may help us explain the reasons Networked Participatory Scholarship came into being. We turn to these issues next.

3. The shared history of scholarship and technology

By considering how technology has influenced the development of scholarship into its current state, we may gain insights into how emerging technologies might further propel the field of scholarly work into new directions. Over seventy-five years ago, Binkley (1935) noted how mass publishing had largely changed the culture of scholarly work and argued that several centuries before, with the invention of the printing press, scholarly materials that had largely been inaccessible to those interested in doing scholarly work were made readily available to both professional and amateur scholars alike. Whereas the canon of scholarly resources had previously only been held in monasteries and libraries, the printing press made duplication of those materials so easy that they soon became accessible to a far larger group of scholars than was previously possible. Through the technological innovation of printing "it became possible for the moderately wealthy man to possess what previously only princes or great religious establishments could afford – a fairly complete collection of the materials he desired" (Binkley, 1935, ¶ 7).

Improved access, however, was reversed in the early nineteenth century by the mass publishing of scholarly work. Whereas in the past the "moderately wealthy" could keep pace with "princes" and "religious establishments" by purchasing common scholarly works, due to the exponential growth in scholarly works, the only scholars who could keep pace with the mass publishing of specialized field data were those who had direct access to a university with resources sufficient to continually purchase recurring publications that were extremely diverse and specialized. Thus, Binkley (1935, ¶ 9) explains that "the qualities of the printing process that began in the fifteenth century to make things accessible have now begun in our different circumstances to make them inaccessible", leading to the death of the "amateur scholar" and the shift of research from the realm of an "honored sport" to that of an "exclusive profession".

Ultimately, though Binkley's heralding of "revolutionary" technological innovations such as microphotography and "near-print" replication may not have panned out as he had anticipated, Binkley's analysis shows that the culture of scholarship has historically been refined, or even changed, by technological innovation and that certain, though not all, technological innovations have the capacity to lead to a fundamental rethinking of how research is done. It may not, however, be the case that this rethinking occurs in anticipated ways. Upon revisiting Binkley's work twelve years later, Tate (1947) points out that though microphotography did not lead to the rebirth of the amateur scholar, as Binkley had hoped and anticipated, it did create new issues in scholarship that would fundamentally change scholarly practice. For instance, given the "oceans of documentation" which emerged from some of Binkley's technologies, researchers found themselves "confronted" and "confounded" by the amount of data now available to them, which led to a rethinking of the role of scholarly aides as guided assistants who waded through the vast number of available reports and articles. Such rethinking is ongoing. For instance, Peacock, Robertson, Williams, and Clausen (2009) predict that learning technologists' roles will expand to include support for faculty who conduct technology-enhanced research (e.g., virtual focus groups).

As digital technologies have emerged, and have become increasingly prevalent in recent years, we have begun to witness similar transformations in the ways that research teams use networking technologies to share and collaborate, publishers use online spaces to collect, review, and disseminate research articles, and educators use social media and networking technologies to enhance various aspects of their teaching. As technologies change and cultures shift, so too do the literacies and skills necessary to operate in professional contexts. For instance, Jenkins, Purushotma, Weigel, Clinton, and Robinson (2009) suggest that due to the proliferation of emerging technologies and their effects on the world, in order to successfully participate in the world, individuals need to develop a new set of competencies that include skills such as appropriation, transmedia navigation, and networking. As scholars similarly find themselves confronted with the challenges of emerging technologies and shifting cultures, they too are being led to adapt and acquire new competencies in order to function in their changing world.

We should be careful however, in attributing causation to technology with regard to shifts in scholarly culture. To illustrate, in anthropological studies, a piece of technology (e.g., pottery, printing press, radio, computer, YouTube, etc.) can be used as a reference for gaining a greater understanding of a particular culture and must be understood as a co-evolutionary artifact with other aspects of culture like language and social behavior (Pfaffenberger, 1992). Similarly, in the current discussion, technology may just as validly be seen as a reflection of cultural trends as a cause of them. In the case of the printing press discussed above, for instance, it may just as arguably be stated that the printing press came about as a result of a widespread cultural belief in the value of accessibility as the reverse. Thus, inferring causality between technology and culture remains a fuzzy issue. As a more modern example, Solum (2006) argues that the growing practice of legal blogging is an effect – a symptom of how legal scholarship has already changed – and not a cause of cultural changes. Similarly, rather than asking how emerging technologies will transform the culture of education scholarship, we could ask what the emergence and use of such tools as Facebook, Twitter, Wordpress, iPads, Smart Phones, and so forth reveals about scholars in both a cultural sense (with regard to how knowledge in our culture has come to be acquired, tested, validated, and shared) as well as within the subculture of the university. Though it is not the goal of this paper to definitively answer causal questions regarding the relationship between technology and culture, we will continue on the premise that the two influence and reflect one another in a complicated way.

4. Emergent techno-cultural stimuli exerting pressure on scholarly practice

If we are to understand how Networked Participatory Scholarship (NPS) is materializing today, we need to recognize that current trends in the dominant technophilic consumer culture, discussions within scholarly subcultures, and developments in journal publishing point to a deep-rooted rethinking of some fundamental beliefs upon which scholarly structures are built. We examine these trends individually in the sections that follow and discuss how these emergent factors exert pressures for NPS adoption and the rethinking of scholarly practice.

4.1. In the dominant culture

Much has changed in the world since the widespread introduction of the Internet and, later, the Participatory Web. These changes have affected how we make and spend money, how we communicate, how we work, how we collaborate, how we play, how we create and sustain relationships, how we talk (e.g., “Google it.”), and how we find and validate information. Jenkins et al. (2009) for instance, note that we live in a *participatory culture*, or, a society in which, empowered with participatory technologies, the consumer no longer passively receives information, media, and artifacts, but also produces them. What are the implications for scholarly practice when everyone is able to contribute information on a massive scale using tools such as Twitter, YouTube, and Facebook?

Within scholarly circles, the effects of these changes have been experienced in varying degrees. One of the most important of these changes, insofar as Networked Participatory Scholarship is concerned, relates to an emergent emphasis upon collaborative work in the form of ‘collectives’ or aggregations of the actions of individuals that are organized in a complex manner to benefit those individuals (Dron & Anderson, 2009). As Bull et al. (2008, p. 100) explain, online “[c]ollaborative projects such as Wikipedia demonstrate that a previously unexploited collective intelligence can be tapped when the right conditions are established”, and the resultant collective artifacts of these exploits have the potential of spurring innovation.

As a culture, we have quickly found great value in online collaborative projects. The English Wikipedia alone, for instance, boasts a collection of 3.2 million articles collectively written by distributed individuals (Wikipedia, 2011), and it has consistently remained in the list of the top ten most visited sites on the Internet (Alexa Top 500 Global Sites, 2011). Firefox, as another example, is a community-developed web browser that is currently the most popular web browsing software in the world (Browser Statistics, 2010). Further, even though lay users may not explicitly recognize other collective software products which they use on a daily basis, by virtue of the fact that the average Internet user employs web server technologies to open web pages and to access content, we as an Internet-using community, have further found great implicit value in other open and collaborative projects like Apache, GNU/Linux, PHP, MySQL, and Python which are persistent in web server environments. Though such collective projects may have been initiated by a relatively small number of technological savants, collectivist models of development and production have diffused into a multiplicity of realms. “Wiki”, for instance, has quickly become a common word as several platforms (e.g., Mediawiki, PBWiki, etc) have emerged and been adopted as valuable information-sharing platforms. A further outgrowth of this phenomenon can be seen more generally in the emerging interest in many fields to study the development and growth of online networks and communities, by which we seek to understand the reality and implications of our interdependence (Briggle & Mitcham, 2009).

Though scholarly practice that utilizes collective ways of thinking may be difficult to find, a few examples have recently surfaced:

- Timothy Gowers used his blog as a platform to engage numerous individuals in producing ideas and solutions to a complex mathematical problem, generating substantial contributions from 27 individuals, and announcing a proof of the problem approximately one-month-and-a-half after the inception of the project (Gowers & Nielsen, 2009).
- A team of ichthyologists called on their Facebook contacts (the majority of whom held doctorates in ichthyology-related fields) who helped identify more than 90% of the 5000 fish specimens collected in the Cuyuni River of Guyana (Smithsonian Science, 2011).

- Alec Couros taught an online course in Fall 2010 that was entitled “Social Media and Open Education” that was available to non-credit participants for free. Couros asked colleagues who were online to help him in teaching the 345 students who expressed interest in enrolling as non-credit students by acting as online Network Mentors and actively supporting these students. Within a few days, 124 individuals volunteered to serve as mentors (A. Couros, personal communication, June 13, 2011) and collectively aided Couros in teaching the non-credit students (Couros, 2010).

Though causal relationships between technological innovation and culture may be unclear, the examples above indicate that there seems to be a case for arguing that technological innovation and the way technologies are used in the larger culture influences various subcultures (e.g., academic publishers, research communities, etc.). For instance, as individuals connect via online social networking sites such as Facebook, this connectedness may lead researchers to utilize their connections for improving scholarly practice (as in the case of the team of ichthyologists mentioned above). To illustrate using a historical example, though the emergence of the printing press may not have reflected the value systems of all scholarly subcultures (e.g., some may have been interested in keeping knowledge sources restricted to elite groups), it could be said that its emergence did reflect the dominant culture of the time (i.e., the common people who were interested in gaining access to knowledge sources), which then influenced elite subcultures. Likewise, it could be argued that though the emergence of technology-driven activities like blogging, social bookmarking, and social networking may not reflect the culture of university scholarship, they might very well reflect aspects of the dominant culture, which then gains power, via the tool, to influence scholarly cultures. Thus, though the relationship between the dominant culture, technology, and subcultures may be ill-understood and extraordinarily complex, it is important to recognize that there is an interplay between the three by which changes in the dominant culture or technology may either reflect or influence transformation in the subculture in a complex and negotiated manner. We should emphasize however, that scholarly work does not exist in a vacuum and that how we view scholarship as a society changes in conjunction with a variety of other factors (e.g., technological innovations, dominant cultural narratives, etc.), which are currently and continually in a state of flux.

4.2. Amongst scholars

For this reason, our understanding of scholarship has been in a state of transformation in recent years. To illustrate, researchers have recently asked foundational questions about the nature of education scholarship as they have reflected on the pursuits of educational scholars (e.g., Berliner, 2002; Bulterman-Bos, 2008; Capraro & Thompson, 2008; Labaree, 2003) and issued calls for a broader vision of scholarly activity and what it means to be a scholar in general (Boyer, 1990; Pellino, Blackburn, & Bober, 1984).

Such evaluations of current scholarly practice may be the result of a fundamental re-conceptualization of scholarship that seeks to move away from emphases on disembodied, autonomous practice to community-conscious approaches (Briggle & Mitcham, 2009; Buckley & Du Toit, 2010). Within the realm of learning theory, a preparatory shift for this realization has gradually come as objectivist epistemologies and behaviorist learning theories have made way for constructivist and socio-constructivist views, which hold that knowledge is constructed in the mind of the learner and, as such, cannot exist independently of knowers (Jenkins, 2006; Lowenthal & Muth, 2009). This transformed view of the mind from a disembodied and objectivist reasoning tool to an embodied, experiential, and social faculty calls into question the validity of monastic scholarly practices which attempt to disassociate the mind, knowledge, and research from social experience. This view paves the way for rethinking how scholarly knowledge is acquired, expanded, and validated given the embodied, social nature of human experience. Nevertheless, we should be clear that even though such embodied practice is present in some aspects of academe, it does not represent the dominant academic culture.

Further, emergent learning approaches which seek to account for increasingly important aspects of social experience in a connected, digital world are coming to the forefront of learning theory discussions. According to Connectivist views, for instance, learning is a negotiated, interconnected, cross-disciplinary, and inherently social process within complex environments (Siemens, 2005, 2006). Though many of these ideas regarding learning are not new (Kop & Hill, 2008) and have been discussed by Vygotsky (1978), Lave and Wenger (1991), and others, they are, nonetheless, finding growing interest amongst practitioners and researchers as evidenced by increasing offerings of freely-available online courses dubbed Massively Open Online Courses (Parry, 2011). Such approaches are noteworthy for the mere reason that they break away from norms of 20th century university scholarship with regard to fundamental epistemological questions regarding what knowledge is, how it is gained, how it is verified, how it is shared, and how it should be valued. These epistemological reframings of learning take form in scholarly practice in a variety of ways, but they are perhaps most noticeable in how scholars are increasingly beginning to question many heretofore non-negotiable artifacts of the 20th century scholarly world. Peer review and online education are prime examples of such artifacts.

Peer review is the first example of how seemingly non-negotiable scholarly artifacts are currently being questioned: while peer review is an indispensable tool intended to evaluate scholarly contributions, empirical evidence questions the value and contributions of peer review (Cole, Cole, & Simon, 1981; Rothwell & Martyn, 2000), while its historical roots suggest that it has served functions other than quality control (Fitzpatrick, 2011). On the one hand, Neylon and Wu (2009, p. 1) eloquently point out that “the intentions of traditional peer review are certainly noble: to ensure methodological integrity and to comment on potential significance of experimental studies through examination by a panel of objective, expert colleagues”, while Scardamalia and Bereiter (2008, p. 9) recognize that “like democracy, it [peer-review] is recognized to have many faults but is judged to be better than the alternatives”. Yet, peer review’s harshest critics consider it an anathema. Casadevall and Fang (2009) for instance, question whether peer review is in fact a subtle cousin of censorship that relies heavily upon linguistic negotiation or grammatical “courtship rituals” to determine value, instead of scientific validity or value to the field, while Boshier (2009) argues that the current, widespread acceptance of peer review as a valid litmus test for scholarly value is a “faith-” rather than “science-based” approach to scholarship, citing studies in which peer review was found to fail in identifying shoddy work and to succeed in censoring originality.

The challenge for scholarly practice is to devise review frameworks that are not just better than the status quo, but systems that take into consideration the cultural norms of scholarly activity, for if they don’t, they might be doomed from their inception. A recent experiment with public peer review online at *Nature*, for example, revealed that scholars exhibited minimal interest in online commenting and informal discussions with findings suggesting that scholars “are too busy, and lack sufficient career incentive, to venture onto a venue such as *Nature*’s

website and post public, critical assessments of their peers' work" (Nature, 2006, ¶ 9). *Shakespeare Quarterly*, a peer-reviewed scholarly journal founded in 1950 conducted a similar experiment in 2010 (Rowe, 2010). While the trial elicited more interest than the one in *Nature* with more than 40 individuals contributing who, along with the authors, posted more than 300 comments, the experiment further illuminated the fact that tenure considerations impact scholarly contributions. Cohen (2010) reported that "the first question that Alan Galey, a junior faculty member at the University of Toronto, asked when deciding to participate in *The Shakespeare Quarterly's* experiment was whether his essay would ultimately count toward tenure". Considering the reevaluation of such an entrenched and centripetal structure of scholarly practice as peer review, along with calls for recognizing the value of diverse scholarly activities (Pellino et al., 1984), such as faculty engagement in K–12 education (Foster et al., 2010), we find that the internal values of the scholarly community are shifting in a direction that may be completely incompatible with some of the seemingly non-negotiable elements of 20th century scholarship.

Online education is the second example of how seemingly non-negotiable scholarly artifacts are currently being questioned: online education has traditionally been organized and supported through Learning Management Systems (LMS), largely as a result of these systems offering opportunities for organization and efficiency (Lee & McLoughlin, 2010). While LMS are popular in higher education settings, with one survey indicating that more than 88% of responding higher education institutions in the United States use an institutional LMS (Green, 2010), scholars have begun questioning whether organization and efficiency should be the guiding principles for integrating technology in their classroom and have begun reflecting on the constraints that these systems impose upon students' learning experiences and opportunities (Veletsianos & Navarrete, in press). For instance, LMS may hinder pedagogical choice through their default settings and familiar affordances (Lane, 2009). As a result, a number of scholars have begun using tools that reside outside the control of their home institution and have employed them in the service of teaching (e.g., social networking sites, self-hosted blogs). At the same time, we have seen these tools used in the emergence of open online courses. While traditional online courses are most frequently organized as *groups* (Dron & Anderson, 2009), a number of open online courses are organized as *networks*. The distinctions between the two are important, because they help illuminate practices that align with Networked Participatory Scholarship. *Groups* are structured around particular tasks, encompass designated roles and hierarchies, include access controls, and are tightly knit (e.g., group members know each others' names). *Networks* on the other hand, are fluid organizational structures in which participation consists of distributed individuals connected in loose and strong ties, membership is mostly unrestricted, and participants may know some but not all members of the network. How does a course structured as a network differ from a course structured as a group, and why is this an example of NPS? In courses organized around networks, course materials are made available to participants (both within and outside of the institution) who then have the ability to self-directedly create networks with other participants to achieve shared learning goals (Bell, 2011). Individuals define their participation and their learning goals, and course activity occurs in distributed online fora. The use of social technologies that networked courses employ go far beyond merely allowing people to "take a course online" and empower learners to participate in self-defined ways. This type of online course breaks away from the norm of 20th century university scholarship by positioning knowledge around social connections rather than around content, enabling scholars to re-envision teaching, instruction, their role as teachers, and the ways that knowledge is acquired in modern society".

Individual scholars' Networked Participatory Scholarship practices further illustrate this point: in recent years numerous scholars have engaged in using technological tools in their research, classrooms, and personal lives in ways that differ from 20th century paradigms of scholarship (Katz, 2010; Kirkup, 2010). Early adopters continue to use these tools despite incompatibilities with social or institutional structures, because they recognize how such tools have the power to support, amplify, or transform their scholarship in positive ways (Katz, 2010). For instance, engaging in NPS via such tools as blogs and online social networks may enable scholars to remain current in their research field, explore new approaches to teaching via networking with colleagues, interact with individuals mentioning their research/work, and expose their work to larger audiences. Consider how scholars use blogs to support scholarly endeavors. Prior research has identified that blogs are used (a) as debate platforms for scholars who seek to live as public intellectuals, (b) for recording and sharing logs of "pure" research, and (c) as a sort of tongue-in-cheek (often pseudonymous) water cooler around which critical discussions of the scholarly experience can occur (Kirkup, 2010; Walker, 2006). Scholars' uses of blogs have also extended beyond research to include teaching endeavors such that it has become necessary to establish frameworks for understanding the educational affordances that blogs may offer (Deng & Yuen, 2011). In a similar manner, scholars have been drawn to social networking sites (SNS) in recent years for a variety of reasons. In a recent survey, Moran, Seaman, and Tinti-Kane (2011) found that nearly 50% of faculty surveyed had posted to an SNS in the past month and that over 75% had visited an SNS in that time. With such prevalent use of SNSs, it is no wonder that faculty are beginning to consider how SNSs can be used to help them teach (Cho, Gay, Davidson, & Ingraffea, 2007; Dunlap & Lowenthal, 2009). Veletsianos (in press) for instance, found that early Twitter adopters used Twitter to make instructional information and resources available to non-students and provided students with opportunities to interact with professional communities outside of the classroom. In each of these cases, we see an ideological shift occurring amongst scholars from established frameworks of academic scholarship and discourse toward structures that are more participatory and empowering, as NPS participation in social media allows the scholar to connect with others (e.g., other scholars, practitioners, and the general public) in ongoing discussion and reflection.

Given these growing phenomena, we should ask: why might scholars be interested in engaging such audiences? Through ethnographic interviews, Nardi, Schiano, and Gumbrecht (2004) found that bloggers use their blogs to "(1) update others on activities and whereabouts, (2) express opinions to influence others, (3) seek others' opinions and feedback, (4) 'think by writing', and (5) release emotional tension". If this pattern holds true for scholars, then it seems safe to say that a growing number of scholars, as evidenced by an ever-growing number of scholarly blogs (Kjellberg, 2010), are interested in connecting their research with their identities. Such a connection may serve to frame their research in a way that is increasingly embodied, experiential, and social, as scholars and faculty members use participatory technologies to circumvent established systems that are neither designed to value nor equipped to support such approaches to reflection and inquiry. Couple this with Solum's argument (2006) that the emergence of blogging is a symptom of changing trends in societal thought and values, and it follows that though blogging may not be transforming scholarship *per se*, growth in academic blogging may reflect a changing set of values amongst many scholars regarding their profession. Thus, though participatory technologies may not necessarily serve as catalysts for changing scholarly norms, their growing use by scholars expresses that the current norms of scholarship are in a state of change.

4.3. Within scholarly journals

Even with such changing definitions of scholarship, a discussion on scholarly practice inevitably turns to outlets of scholarly work: the valued media by which scholars connect with the culture that values their work. Technological innovation and cultural shifts have had, and continue to have, an impact on scholarly journals, and developments in this domain parallel the NPS practices that we have described above. These developments can be summarized in three related themes. First, we have seen a transition from print-only journals to print and online journals. Second, Open Access publishing has experienced increasing interest. Third, researchers and institutions have sought new ways to evaluate the impact and reach of scholarly work. These issues are examined in detail next.

The dawn of the digital age has had a marked influence on print publishing as stakeholders have realized the benefits afforded by digital dissemination. For example, scholars can access scholarly work published in electronic outlets, such as digital databases, more efficiently, and publishers can make scholarly work available faster than if the work was published in print-only form. In interviewing authors who disseminated their books online for free, [Hilton and Wiley \(2010\)](#) also found that authors perceived that this act enabled them to reach a greater and wider audience without negatively impacting the sales of their books. Additionally, digital publishing enables alternative forms of content in scholarly work including dynamic content, visualizations, and multimedia integration, such as audio or video interviews ([Pearce et al., 2010](#)). The transition to online journals, however, has had further influences on access and journal usage; reports from electronic journal introductions for instance, indicate that print journal usage has decreased significantly after the introduction of online journals ([De Groote & Dorsch, 2001](#); [Rogers, 2001](#)).

Since the development of the printing press and through the transition to online journals, scholars have embraced methods of broad dissemination of their work. Cultural shifts, such as the Open Access (OA) movement, have shown promise for democratizing access to knowledge and exerted significant pressures on academic publishing. The [Budapest Open Access Initiative \(2002, ¶ 3\)](#) defines OA as literature which is made available for free online “permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself”. Since the launch of the Educational Resources Information Center (ERIC) in the U.S. in 1969 as a medium for providing access to education research and information, OA has continued to evolve and has received increased interest in recent years, evidenced in part by the recent wave of higher education institutions passing open access resolutions and mandates requesting faculty to share their scholarly work in an open access manner ([Harnad, 2008](#)). For instance, a recent study of a random sample of 1837 peer-reviewed publications found that 20.4% of them were available for free online either through the publisher’s website or through a web search ([Björk et al., 2010](#)). As we have already noted, cultural and technological shifts are difficult to differentiate because they influence each other. In the case of OA however, it would have been physically impossible for scholars to make their work available in an OA manner during the age of print publishing. Digital publication, provides scholars with the ability to disseminate work without physical or economic barriers.

Currently, the number of reputable and peer-reviewed OA journals in the field of education is limited, even though such journals are quickly becoming viable options for scholars to consider ([Furlough, 2010](#)). Scholars have proposed that numerous benefits can be derived from publishing their work in ways that align with the spirit of open access. Empirical investigations comparing OA and non-OA academic journals indicate that (a) OA publications tend to be cited more heavily than non-OA (NOA) publications and (b) there is no evidence to suggest that OA publishing harms citations. For instance, [Hajjem, Harnad, and Gingras \(2005\)](#) evaluated 1.3 million articles published in ten disciplines between 1992 and 2003 and found that NOA papers that were self-archived have had more citations than papers that were not self-archived. [Eysenbach \(2006\)](#) reached a similar conclusion in a longitudinal analysis of paper citations, when he found that OA papers were more likely to be cited than NOA papers. [Zawacki-Richter, Anderson, and Tuncay \(2010\)](#) compared six OA and six NOA journals in the field of Distance Education and found no significant differences in terms of citation counts between the two. Additionally, empirical evidence relating to citation metrics indicates that OA articles may be cited earlier than NOA articles ([Eysenbach, 2006](#); [Zawacki-Richter et al., 2010](#)), suggesting that OA may allow faster access to scholarly work and thereby accelerate scholarly dissemination and development.

Finally, as researchers and institutions seek new ways to evaluate the impact and reach of scholarly work, the field has seen renewed emphasis on journal impact factors, article-level metrics (such as citation counts), and journal quality. While scholarly publishing has traditionally been evaluated in terms of citation counts and the quality of the journal in which a paper was published ([Goodyear et al., 2009](#)), varied technology-informed metrics have recently been proposed in an attempt to more fully capture the influence of scholarly work. For instance, the [Public Library of Science \(2010\)](#) has begun publishing a variety of metrics for each of their publications including article usage statistics (e.g., page views), comments/notes/ratings left by article readers, and blog posts citing published articles. [Priem and Hemminger \(2010\)](#) call attention to Scientometrics 2.0 as the idea of using social media to examine journal article use and citations in the participatory nature of the Web. Such data may help scholars gain a firm understanding of the impact of their scholarship and outreach, provide transparency to the research community, and allow richer depictions of a scholar’s influence and impact. Nevertheless, notwithstanding the *opportunities* that participatory technologies present for scholarly dialog, [Neylon and Wu \(2009\)](#) indicate that papers published in science-related journals with online commenting platforms exhibit a low volume of comments. The issues, these authors suggest, are partly social as scholars (a) lack incentives to spend the time to post comments on online publications and (b) may be unsure of what is appropriate to post in these emergent fora.

4. Conclusion

In this paper, we explored the meaning of Networked Participatory Scholarship and the historical relationship between technology and scholarly endeavors. We then discussed cultural and technological trends influencing scholars to adopt networked participatory practices and factors impacting the rejection of digital practices, thereby attempting to illuminate the complexity of the issues involved. We have claimed that the emergence of Networked Participatory Scholarship as a practice has extensive implications for scholars, scholarship, and academic institutions and that the cultural shifts underpinning such a transition are an important dimension in any discussion surrounding higher education and scholarship.

What, then, is the role of the scholar in the participatory age? The discussion and observations outlined above suggest that emergent practice in Networked Participatory Scholarship is still largely in a phase of ongoing development within the larger, ever-fluctuating

profession of scholarship. Whether they recognize it or not, scholars are part of a complex techno-cultural system that is ever changing in response to both internal and external stimuli, including technological innovations and dominant cultural values. Though such an understanding may lead to a certain level of trepidation regarding the shape of scholarship's uncertain future, we should take an active role in influencing the future of scholarship and establishing ourselves as productive participants in an increasingly networked and participatory world.

Acknowledgements

The authors would like to thank the anonymous reviewers for their feedback and suggestions. An earlier version of this manuscript was shared as a "discussion paper" with the Instructional Technology Forum (ITFORUM) during April 2010, and the authors would like to thank ITFORUM participants and moderators for their feedback.

References

- Alexa Top 500 Global Sites. (2011). Retrieved on 02.06.11, from <http://www.alexa.com/topsites>.
- Alexander, K. (2007). Balancing the challenges of today with the promise of tomorrow: a presidential perspective. In M. D'Ambrosio, & R. Ehrenberg (Eds.), *Transformational change in higher education: Positioning colleges and universities for future success* (pp. 16–29). Cheltenham, UK: Edward Elgar Publishing.
- Andersen, D. (2003). *Digital scholarship in the tenure, promotion, and review process*. New York, NY: M.E. Sharpe.
- Ayers, E. (2004, January 30). Doing scholarship on the web: 10 years of triumphs and a disappointment. *The Chronicle of Higher Education*, Retrieved from <http://chronicle.com/article/Doing-Scholarship-on-the-Web-/18713>.
- Bell, F. (2011). Connectivism: its place in theory-informed research and innovation in technology-enabled learning. *International Review of Research in Open and Distance Learning*, 12(3), 98–118.
- Berge, Z., & Collins, M. (1995). Computer-mediated scholarly discussion groups. *Computers & Education*, 24(3), 183–189.
- Berliner, D. (2002). Educational research: the hardest science of all. *Educational Researcher*, 31(8), 18–20.
- Binkley, R. C. (1935). New tools for men of letters. *The Yale Review*, 24, 519–537.
- Björk, B.-C., Welling, P., Laakso, M., Majlender, P., Hedlund, T., & Guðni, G. (2010). Open access to the scientific journal literature: situation 2009. *PLoS One*, 5(6), e11273.
- Borgman, C. (2007). *Scholarship in the digital age: Information, infrastructure, and the Internet*. Hong Kong: MIT Press.
- Boshier, R. (2009). Why is the scholarship of teaching and learning such a hard sell? *Higher Education Research & Development*, 28(1), 1–15.
- Boyer, E. (1990). *Scholarship reconsidered: Priorities for the professoriate*. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.
- Briggles, A., & Mitcham, C. (2009). Embedding and networking: conceptualizing experience in a technosociety. *Technology in Society*, 31(4), 374–383.
- Browser Statistics. (2010). Web statistics and trends. Retrieved on 30.07.10, from http://www.w3schools.com/browsers/browsers_stats.asp.
- Buckley, S., & Du Toit, A. (2010). Academics leave your ivory tower: form communities of practice. *Educational Studies*, 36(5), 493–503.
- Budapest Open Access Initiative. (2002). Retrieved on 30.07.10 from <http://www.soros.org/openaccess/read.shtml>.
- Bull, G., Thompson, A., Searson, M., Garofalo, J., Park, J., Young, C., et al. (2008). Connecting informal and formal learning experiences in the age of participatory media. *Contemporary Issues in Technology and Teacher Education*, 8(2), 100–107.
- Bulterman-Bos, J. A. (2008). Will a clinical approach make education research more relevant for practice? *Educational Researcher*, 37(7), 412–420.
- Burton, G. (2009). The open scholar. Blog entry in academic evolution. Retrieved on 12.08.10 from <http://www.academicrevolution.com/2009/08/the-open-scholar.html>.
- Capraro, R. M., & Thompson, B. (2008). The educational researcher defined: what will future researchers be trained to do? *The Journal of Educational Research*, 101(4), 247–253.
- Casadevall, A., & Fang, F. C. (2009). Is peer review censorship? *Infection and Immunity*, 77(4), 1273–1274.
- Cho, H., Gay, G., Davidson, B., & Ingraffea, A. (2007). Social networks, communication styles, and learning performance in a CSCL community. *Computers & Education*, 49(2), 309–329.
- Chong, E. K. M. (2010). Using blogging to enhance the initiation of students into academic research. *Computers & Education*, 55(2), 798–807.
- Cohen, L. (2007). Social scholarship on the rise. Blog entry posted to Library 2.0: an academic's perspective. Retrieved on 12.08.10 from http://liblogs.albany.edu/library20/2007/04/social_scholarship_on_the_rise.html.
- Cohen, P. (2010). Scholars test web alternative to peer review. *The New York Times*, Retrieved on 12.09.10 from <http://www.nytimes.com/2010/08/24/arts/24peer.html?pagewanted=2>.
- Conole, G. (2011). Book: designing for learning in an open world. Retrieved on 12.04.11 from <http://cloudworks.ac.uk/cloudscape/view/2155>.
- Cole, S., Cole, J., & Simon, G. (1981). Chance and consensus in peer review. *Science*, 214, 881–886.
- Couros, A. (2010). Call for network mentors – follow-up. Retrieved on 14.06.11 from <http://educationaltechnology.ca/couros/1877>.
- De Groot, S. L., & Dorsch, J. L. (2001). Online journals: impact on print journal usage. *Bulletin of the Medical Library Association*, 89(4), 372–378.
- Deng, L., & Yuen, A. (2011). Towards a framework for educational affordances of blogs. *Computers & Education*, 56(2), 441–451.
- Dron, J., & Anderson, T. (2009). How the crowd can teach. In S. Hatzipanagos, & S. Warburton (Eds.), *Handbook of research on social software and developing ontologies* (pp. 1–17). London: IGI Global.
- Dunlap, J., & Lowenthal, P. (2009). Tweeting the night away: using Twitter to enhance social presence. *Journal of Information Systems Education*, 20(2), 129–135.
- Eysenbach, G. (2006). Citation advantage of open access articles. *PLoS Biology*, 4(5), e157.
- Fitzpatrick, K. (2011). *Planned obsolescence: Publishing, technology, and the future of the academy*. New York, NY: New York University Press.
- Foster, K., Bergin, K., McKenna, A., Millard, D., Perez, L., Prival, J., et al. (2010). Partnerships for STEM education. *Science*, 329, 906–907.
- Furlough, M. (2010). Open access, education research, and discovery. *The Teachers College Record*, 112(10), 2623–2648.
- Goodyear, R. K., Brewer, D. J., Gallagher, K. S., Tracey, T. J. G., Claiborn, C. D., Lichtenberg, J. W., et al. (2009). The intellectual foundations of education: core journals and their impacts on scholarship and practice. *Educational Researcher*, 38(9), 700–706.
- Gowers, T., & Nielsen, M. (2009). Massively collaborative mathematics. *Nature*, 461(7266), 879–881.
- Green, K. (2010). Campus computing, 2010: the 21st national survey of computing and information technology in U.S. higher education. Retrieved on 05.03.11 from <http://www.campuscomputing.net/summary/2010-campus-computing-survey>.
- Greenhow, C., Robelia, B., & Hughes, J. E. (2009). Learning, Teaching, and Scholarship in a Digital Age: Web 2.0 and Classroom Research: What Path Should We Take Now? *Educational Researcher*, 38(4), 246–259.
- Greenhow, C. (2009). Social scholarship: applying social networking technologies to research practices. *Knowledge Quest*, 37(4), 42–47.
- Hajjem, C., Harnad, S., & Gingras, Y. (2005). Ten-year cross-disciplinary comparison of the growth of open access and how it increases research citation impact. *IEEE Data Engineering Bulletin*, 28(4), 39–47.
- Harnad, S. (2008). Waking OA's "Slumbering giant": the University's mandate to mandate open access. *New Review of Information Networking*, 14(1), 51–68.
- Hilton, J., & Wiley, D. (2010). Free: why authors are giving books away on the Internet. *Tech Trends*, 54(2), 43–49.
- Hughes, J., Thomas, R., & Scharber, C. (2006). Assessing technology integration: the RAT – replacement, amplification, and transformation framework. In C. Crawford (Ed.), *Proceedings of society for information technology & teacher education international conference 2006* (pp. 1616–1620). Chesapeake, VA: AACE.
- Jenkins, H., Purushotma, R., Weigel, M., Clinton, K., & Robinson, A. J. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century*. Cambridge, MA: The MIT Press.
- Jenkins, J. (2006). Constructivism. In F. W. English (Ed.), *Encyclopedia of educational leadership and administration* (pp. 195–199). Thousand Oaks, CA: Sage Reference.
- Hutchings, P., & Shulman, L. (1999). The scholarship of teaching: new elaborations, new developments. *Change*, 31(5), 10–15.
- Katz, R. (2010). Scholars, scholarship, and the scholarly enterprise in the digital age. *Educause Review*, 45(2), 44–56.
- Kiernan, V. (2000). Rewards remain dim for professors who pursue digital scholarship. *The Chronicle of Higher Education*, Retrieved on 10.08.10 from <http://chronicle.com/article/Rewards-Remain-Dim-for/6441>.
- King, K. (2002). Educational technology professional development as transformative learning opportunities. *Computers & Education*, 39(3), 283–297.

- Kirkup, G. (2010). Academic blogging: academic practice and academic identity. *London Review of Education*, 8(1), 75–84.
- Kjellberg, S. (2010). I am a blogging researcher: motivations for blogging in a scholarly context. *First Monday*, 15(8).
- Kop, R., & Hill, A. (2008). Connectivism: learning theory of the future or vestige of the past? *International Review of Research in Open and Distance Learning*, 9(3), 1–13.
- Kumashiro, K., Pinar, W., Graue, E., Grant, C., Benham, M., Heck, R., et al. (2005). Thinking collaboratively about the peer-review process for journal-article publication. *Harvard Educational Review*, 75(3), 257–285.
- Labaree, D. F. (2003). The peculiar problems of preparing educational researchers. *Educational Researcher*, 32(4), 13–22.
- Lane, L. (2009). Insidious pedagogy: how course management systems impact teaching. *First Monday*, 14(10).
- Language Learning and Social Media Project (2011). Mendeley Group. Retrieved on 20.06.11 from <http://www.mendeley.com/groups/542561/language-learning-social-media/>.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Lee, M. J. W., & McLoughlin, C. (2009). Beyond distance and time constraints: applying social networking tools and Web 2.0 approaches to distance learning. In G. Veletsianos (Ed.), *Emerging Technologies in Distance Education*, (pp. 61–87). Edmonton, AB: Athabasca University Press.
- Lowenthal, P., & Muth, R. (2009). Constructivism. In E. F. Provenzo (Ed.), *Encyclopedia of the social and cultural foundations of education* (pp. 177–179). Thousand Oaks, CA: Sage Publications Inc.
- Martindale, T., & Wiley, D. A. (2005). Using weblogs in scholarship and teaching. *Tech Trends*, 49(2), 55–61.
- Moran, M., Seaman, J., & Tinti-Kane, H. (2011). *Teaching, learning, and sharing: How today's higher education faculty use social media for work and for play*. Pearson Learning Solutions. Retrieved on 10.09.11 from <http://www.pearsonlearningsolutions.com/blog/2011/05/09/teaching-learning-and-sharing-how-todays-higher-education-faculty-use-social-media/>.
- Nardi, B. A., Schiano, D. J., & Gumbrecht, M. (2004). Blogging as social activity, or, would you let 900 million people read your diary? In *Proceedings of the 2004 ACM conference on computer supported cooperative work*, (pp. 222–231). New York: ACM Press.
- Nature. (2006). Peer review and fraud. *Nature*, 444, 971–972.
- Neylon, C., & Wu, S. (2009). Article-level metrics and the evolution of scientific impact. *PLoS Biology*, 7(11), e1000242.
- Oblinger, D. G. (2010). From the campus to the future. *Educause Review*, 45(1), 42–52.
- Palmer, C., Tefreau, L., & Pirmann, C. (2009). Scholarly information practices in the online environment: themes from the literature and implications for library service development. Retrieved on 18.04.11 from <http://www.oclc.org/programs/publications/reports/2009-02.pdf> Report commissioned by OCLC research.
- Parry, M. (2011). U. of Illinois at Springfield offers new 'massive open online course'. *The Chronicle of Higher Education*, Retrieved on 24.06.11 from <http://chronicle.com/blogs/wiredcampus/u-of-illinois-at-springfield-offers-new-massive-open-online-course>.
- Peacock, S., Robertson, A., Williams, S., & Clausen, M. G. (2009). The role of learning technologists in supporting e-research. *Research in Learning Technology*, 17(2), 115–129.
- Pearce, N., Weller, M., Scanlon, E., & Kinsley, S. (2010). Digital scholarship considered: how new technologies could transform academic work in education. *In Education*, 16(1).
- Pellino, G., Blackburn, R., & Boberg, A. (1984). The dimensions of academic scholarship: faculty and administrator views. *Research in Higher Education*, 20(1), 103–115.
- Pfaffenberger, B. (1992). Social anthropology of technology. *Annual Review of Anthropology*, 21(1), 491–516.
- Priem, J., & Hemminger, B. H. (2010). Scientometrics 2.0: new metrics of scholarly impact on the social web. *First Monday*, 15(7).
- Public Library of Science. (2010). Article level metrics. Retrieved on 14.09.10 from <http://article-level-metrics.plos.org/>.
- Purdy, J., & Walker, J. (2010). Valuing digital scholarship: exploring the changing realities of intellectual work. *Profession*, 19, 177–195.
- Rhoads, R., & Liu, A. (2009). Globalization, social movements, and the American university: implications for research and practice. In J. Smart (Ed.), *Higher Education: Handbook of Theory and Research*, XXIV (pp. 273–315). New York, NY: Springer-Verlag.
- Rogers, A. (2001). Electronic journal usage at Ohio State University. *College & Research Libraries*, 62(1), 25–34.
- Rothwell, P. M., & Martyn, C. N. (2000). Reproducibility of peer review in clinical neuroscience: is agreement between reviewers any greater than would be expected by chance alone? *Brain*, 123, 1964–1969.
- Rowe, K. (2010). From the Editor: Gentle Numbers. *Shakespeare Quarterly*, 61(3), iii–vii.
- Scardamalia, M., & Bereiter, C. (2008). Pedagogical biases in educational technologies. *Educational Technology*, 48(3), 3–11.
- Semington, P. (2011). Big ideas on doing an "Interactive Read-Aloud" when reading to children. Retrieved on 10.06.11 from <http://www.youtube.com/watch?v=HlrOoLqHUVs> YouTube video clip.
- Siemens, G. (2005). Connectivism: a learning theory for the digital age. *Journal of Instructional Technology and Distance Learning*, 2(1).
- Siemens, G. (2006). *Knowing knowledge*. Vancouver, BC, Canada: Lulu Publishers.
- Siemens, G., & Matheos, K. (2010). Systemic changes in higher education. *In Education*, 16(1).
- Smithsonian Science. (2011). Facebook friends help scientists quickly identify nearly 5000 fish specimens collected in Guyana. Retrieved on 12.06.11 from <http://smithsonianscience.org/2011/03/facebook-friends-help-scientists-quickly-identify-nearly-500-fish-specimens-collected-in-guyana/>.
- Solum, L. B. (2006). Blogging and the transformation of legal scholarship. *Washington Law Review*, 84, 1071–1088.
- Tate, V. D. (1947). From Binkley to Bush. *The American Archivist*, 10(3), 249–257.
- Thagard, P. (1997). Collaborative knowledge. *Noûs*, 31(2), 242–261.
- Unsworth, J. (2000). Scholarly primitives: what methods do humanities researchers have in common, and how might our tools reflect this?. In *Symposium on humanities computing: Formal methods, experimental practice* London: King's College, Retrieved on 19.04.11, from <http://jefferson.village.virginia.edu/~jmu2m/Kings.5-00/primitives.html>.
- Veletsianos, G. (2010). A Definition of Emerging Technologies for Education. In G. Veletsianos (Ed.), *Emerging Technologies in Distance Education*, (pp. 3–22). Edmonton, AB: Athabasca University Press.
- Veletsianos, G. (in press). Higher Education Scholars' Participation and Practices on Twitter. *Journal of Computer Assisted Learning*.
- Veletsianos, G., & Navarrete, C. (in press). Online Social Networks as Formal Learning Environments: Learner Experiences and Activities. *The International Review of Research in Open and Distance Learning*.
- Vygotsky, L. (1978). *Mind in society*. London, UK: Harvard University Press.
- Walker, J. (2006). Blogging from inside the ivory tower. In A. Bruns, & J. Jacobs (Eds.), *Uses of blogs* (pp. 127–138). New York, NY: Peter Lang.
- Weller, M. (2009). Thoughts on digital scholarship. Retrieved on 11.08.10 from http://nogoodreason.typepad.co.uk/nogood_reason/2010/07/thoughts-on-digital-scholarship.html.
- Wesch, M. (2011). The Visions of Students Today – Call for Submissions. Blog Entry in Digital Ethnography @ Kansas State University. Retrieved on September 12.09.11 from <http://mediatedcultures.net/ksudigg/?p=276>.
- Wikipedia. (2011). In *Wikipedia, the free encyclopedia*. Retrieved on June 23, 2011 from <http://en.wikipedia.org/wiki/Wikipedia>.
- Zawacki-Richter, O., Anderson, T., & Tuncay, N. (2010). The growing impact of open access distance education journals: a bibliometric analysis. *The Journal of Distance Education/Revue De L'Éducation à Distance*, 24(3).