УНИВЕРСИТЕТ

THE DIGITAL SCHOLAR REVISITED

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The book *The Digital Scholar* was published in 2011, and used Boyer's framework of scholarship to examine the possible impact of digital, networked technology on scholarly practice. In 2011 the general attitude towards digital scholarship was cautious, although areas of innovative practice were emerging. Using this book as a basis, the author considers changes in digital scholarship since its publication. Five key themes are identified: mainstreaming of digital scholarship, so that it is a widely accepted and encouraged practice; the shift to open, with the emphasis on the benefits that open practice brings rather than the digital or networked aspects; policy implementation, particularly in areas of educational technology platforms, open access policies and open educational resources; network identity, emphasising the development of academic identity through social media and other tools; criticality of digital scholarship, which examines the negative issues associated with online abuse, privacy and data usage. Each of these themes is explored, and their impact in terms of Boyer's original framing of scholarly activity considered. Boyer's four scholarly activities of discovery, integration, application and teaching can be viewed from the perspective of these five themes. In conclusion what has been realised does not constitute a revolution in academic practice, but rather a gradual acceptance and utilisation of digital scholarship techniques, practices and values. It is simultaneously true that both radical change has taken place, and nothing has fundamentally altered. Much of the increased adoption in academia mirrors the wider penetration of social media tools amongst society in general, so academics are more likely to have an identity in such places that mixes professional and personal.

Keywords: digital scholarship, e-learning, higher education, open education, social media.

ЦИФРОВОЙ УЧЕНЫЙ: НОВОЕ ПРОЧТЕНИЕ

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Книга «Цифровой ученый» была опубликована в 2011 году, и теоретической основой для исследования возможного влияния цифровых, сетевых технологий на преподавательскую и научно-исследовательскую деятельность в ней послужил подход Эрнеста Л. Бойера. В 2011, несмотря на развитие инновационных практик в использовании цифровых технологий в данных областях, к этому в основном относились крайне осторожно. Отталкиваясь от изложенного в данной книге, автор дает оценку произошедшим с тех пор изменениям. Круг рассматриваемых вопросов включает пять основных подтем: цифровая деятельность ученого как общепризнанная и поощряемая; акцент на открытость и ее преимуществах, появляющиеся благодаря цифровым, сетевым технологиям; реализация политики открытого доступа и открытых образовательных ресурсов, в частности, в отношении функционирования платформ образовательных технологий; сетевая идентичность, акцентирующая развитие академической идентичности с использованием социальных сетей и других инструментов; критический анализ цифровых практик в науке и образовании, сосредоточенный на исследовании их негативных аспектов, связываемых с проблемами киберагрессии, защиты частной жизни и использования данных. Указанные темы рассматриваются в том числе в перспективе исходного подхода Бойера к исследованию академических практик, таких как открытие, интеграция, применение и преподавание. В заключение отмечается, что вряд ли здесь можно говорить о некой революции в академической деятельности, а скорее, о постепенном принятии и использовании цифровых техник, практик и ценностей. Мы сталкиваемся одновременно с двоякой ситуацией: с одной стороны, имели место поистине радикальные изменения, но с другой – в фундаментальном отношении, все осталось по-прежнему. Все большее принятие и адаптация цифровых практик в академической среде отражает растущую популярность инструментов социальных медиа в обществе в целом, и представители академической среды, соответственно, все более склоняются к конструированию собственной сетевой идентичности – как профессиональной, так и личной.

Ключевые слова: цифровые практики в науке и образовании, e-learning, высшее образование, открытое образование, социальные медиа.

Introduction

In 2011, the author published a book entitled *The Digital Scholar*. It was an attempt to examine the impact of digital, networked technologies on scholarly practice. This arose after a decade which had seen the web 2.0 phenomenon, the advent of tools such as Twitter, Facebook, the widespread use of blogging and social sharing, as well as academic developments in open access publishing and open educational resources (OER). Since 2011, there have been a number of further social media tools that have gained widespread popularity (for example Instagram, and Snapchat), the widespread adoption of Twitter and Facebook into all aspects of society and academic developments such as MOOCs, learning analytics, and the integration of tools into education.

This represents an opportunity then to consider the changes in practice since the book's publication and to examine the current landscape of digital scholarship, with particular reference to current challenges and future directions.

Firstly, it is necessary to re-examine the main themes and claims of the 2011 book. In order to examine the different features of digital scholarship, Boyer's 1990 framework of scholarship was adopted. This provided a useful bridging mechanism from 'traditional' scholarship to the opportunities of digital scholarship. Boyer proposed four main categories of scholarly activity:

- Discovery – the creation of new knowledge in a specific area or discipline, often synonymous with genesis research.
- Integration – working on interpretation and inter-disciplinary tasks. Boyer states that it is "making connections across the disciplines, placing the specialties in larger context, illuminating data in a revealing way, often educating non-specialists" [Boyer, 1990].
- Application – engagement with the wider world outside academia, which might include public engagement activities as well as input into policy and general media discussions.
- Teaching – much of the interpretation of Boyer can be seen as an attempt to raise the profile of teaching. He argues that "the work of the professor becomes consequential only as it is understood by others. Yet, today, teaching is often viewed as a routine function, tacked on" [Boyer, 1990].

This framework proved robust for considering changes in scholarly practice brought about by the advent of digital, networked technologies. At the time of writing in 2010-11 although e-learning had entered the mainstream with widespread adoption of Learning Management Systems, [Medved, 2015] much of the focus was on the potential of digital scholarship. A number of studies at the time indicated that adoption of new technology by academics was cautious and often greeted with suspicion. Proctor, Williams and Stewart perhaps summarised the prevailing attitude, finding "frequent or intensive use is rare, and some researchers regard blogs, wikis and other novel forms of communication

as a waste of time or even dangerous" [Procter et al, 2010]. In the intervening period, use of internet technology and in particularly social media has become pervasive across much of society, influencing politics, journalism, entertainment, and retail as well as education.

Digital scholarship was itself a relatively new term and concept in 2011. In this article the author will reflect on how digital scholarship has developed since that early foundation as an area of interest for academics, by devising themes that address the most significant areas of development. These are a personal interpretation of the significant changes since 2011, based on the author's experience of writing that book, delivering workshops and seminars based on it, and researching in the area of digital scholarship and open educational practice. While they are likely to be of interest therefore to those in the field of digital scholarship, they do not represent a comprehensive review of literature.

Themes

In examining the development of digital scholarship since the publication of *The Digital Scholar* five broad themes emerge, which interrelate, sometimes acting as drivers for digital scholarship uptake, and other times as brakes on its wholesale adoption.

Mainstreaming of digital scholarship

The first theme can be seen as the foundation for subsequent ones, which is the broad acceptance of digital scholarship. The use of digital, networked technology in all aspects of scholarship has become part of the mainstream of practice. Not only is it no longer unusual to meet an academic with a blog or a Twitter account, but online identity is now seen as a central part of what it means to be an academic. Research projects will make use of Twitter accounts to both disseminate findings and recruit subjects; online digital databases now form part of a researcher's toolkit and tools for analyzing social media; VLE and geo data have generated new insights and approaches. In teaching the advent of MOOCs may have been accompanied by hype but it also raised the profile of online education in general.

This pervasiveness of digital provision across all universities is highlighted by findings such as a review of distance education universities globally by Qayyum and Zawacki-Richter who conclude that
1. Online and distance education enrolments are strong and mainly growing
2. Existing institutions are increasing their online and distance education offerings
3. New institutions are offering online and distance education [Qayyum, Zawacki-Richter, 2017].

Similarly, when examining the use of online teaching at research intensive universities, Mapstone, Buitendijk and Wiberg find that academics are keen to embrace innovations that facilitate the mission of broadening understanding beyond the university, suggesting that "it is

in the interests of RIUs to generate a full-scale digital strategy, in which MOOCs will be but one element" [Mapstone et al, 2014].

The impact of digital, networked technology then is evident in most aspects of scholarly practice. However, there are both areas where its impact is not recognized still, and perhaps more interestingly, new issues it has raised for academics to address. It is against this broad backdrop of mainstreaming of digital scholarship, that the subsequent themes emerge.

The Shift to Open

Closely allied to digital scholarship is the development of open practice, which can be seen as a third component in the requirements for digital scholarship, building on digital and networked aspects. The past twenty years saw the impact of two major, interconnected technologically driven changes in society, giving rise to what Castells termed the 'Network Society' (1996), namely the transition to digital content and the impact of a pervasive network allowing almost permanent and instant access to resources, data and people. It is the impact of these two major developments that has driven change across a range of sectors, including commerce, research, politics, and citizenship. Openness can be seen as a distinct category, overlaying and intersecting the digital, networked changes. While the first two components are necessary for digital scholarship, it is the rise of openness in practice that has seen the greatest area of interest.

Open approaches require a digital, networked infrastructure to become pervasive, and although the provision of this varies globally, it is sufficiently widespread that we can be seen to be entering the 'age of open'. For example, there have been numerous digital models of economics proposed, such as Anderson's (2007) Long Tail, or Evans and Wurster's unbundling of services (2000), but the impact of openness such as open licenses, open practice and an open approach to design do not form the central focus of such models. They can be seen as rooted in the digital revolution, and not foregrounding the open aspect of practice. Benyayer defines the central economic questions for open models as "how does an organization ensure its continuity if it doesn't monetize its production and if it authorizes others to use it?" [Benyayer, 2016].

What constitutes openness in a disciplinary, geographical, political, technological or cultural sense can vary. In the modern, digital, pervasive, networked form it is typically characterised by some combination of the following:

- use of open licenses that permit reuse (such as Creative Commons);
- sharing ideas and resources by default;
- distributed contribution from a diverse network;
- novel application of openly available technologies;
- reallocation of resources to production and away from purchasing;

- working across existing boundaries.

Openness has seen large-scale recent developments becoming part of the mainstream to the extent that The Economist declared that open vs. closed has now replaced right vs. left in political discourse [The Economist, 2016]. Henry Chesbrough defined open innovation as innovation that transcends the boundaries of the organization conducting it and draws upon distributed knowledge [Chesbrough, 2006]. Examples of this sort of open innovation include Product Platforming, which allows users to extend a software platform through a tool-kit (such as a Software Development Kit SDK); Idea competitions, which encourage competition between contributors, for example Lego Ideas which takes inputs from users and can lead to product development; open science, where users can participate in scientific projects, such as help shape research questions, for example Galaxy Zoo where users assist in the morphological classification of galaxies. In this interpretation, openness is viewed as means of gathering input from a wide range of stakeholders. It is a key characteristic of how innovation occurs within a sector, and is actively designed into the process.

Openness can also be seen as offering new models for allocating resources. Weller argues that openness can lead to a new economic model, termed the open flip, built on the adoption of open licences [Weller, 2016]. Briefly stated, the open flip is a reallocation of finances away from purchasing copyrighted resources to the production of openly licensed ones. Open licences (most commonly those of Creative Commons) provide legal permission for the reuse and adaptation of content, while protecting the originator's right to be acknowledged. The open flip has been developed for education particularly, notably the mainstream adoption of open access models in publishing, the release of open education resources (OERs), and more recently large scale open courses, known as MOOCs (massive open online courses).

To find good examples of the open flip model in operation we can look to the open textbook movement in North America. The price of textbooks has become an increasing issue for North American students, with the average cost per student in excess of $900 [Hilton III et al, 2014]. This prompted OER producers in the United States to focus on creating openly licensed textbooks while advocates lobbied for their widespread adoption. In terms of savings to students the average figure of $100 per textbook per student has been estimated by OpenStax (https://openstax.org/impact) realising an estimated total saving to students of $66 million. The findings from such projects have been positive, with research demonstrating the efficacy and quality of such textbooks is as good if not better than existing ones [Fisher et al, 2015].

In education 'open' has become a modifier for many terms, giving rise to open textbooks, open data, open pedagogy, open science and open educational practice. The increase in profile of open practice then underpins many of the subsequent themes, to the extent that open scholarship may in fact be a more descriptive term than digital scholarship.

Policy development

A further aspect of this mainstreaming is the development of institutional, regional or national policies with respect to different aspects of digital scholarship. Most prominent of these are the development of open access mandates which state that the outcomes of research funded by a particular body need to be released openly. The Registry of Open Access Repository Mandates and Policies (ROARMAP) tracks such policies at the funder, research organisation and multiple organisation level. It indicates that in 2011 (when *The Digital Scholar* was published) there were 387 such policies in total, compared with 887 at the end of 2017, in 68 different countries.

Related to open access publication mandates are policies relating to open data, which state that, as with publications, data arising from publicly funded research projects should be openly available. This area is less well developed than open access publications, but growing rapidly, in part because such policies can build on the work established by open access mandates. For example, SPARC Europe (2017) found that 13 European nations had open data policies at a national level, with most having been implemented recently. About half of these used the existing open access policy to expand coverage to open data.

These policies are significant from a digital scholarship perspective because they raise the profile of issues associated with openness, as detailed previously. It becomes increasingly difficult for an academic to remain unaware of open practice, and in turn to reflect on how their own practice is affected. This particularly relates to data. Whether a publication is open access or not may be of little concern to an academic with full library access, but being required to release data openly necessitates engagement with making data suitable for release, and the possibility of combining with other open data sets.

In terms of teaching, policies relating to open educational resources are similarly increasing. Keskin *et al* (2017) examined OER and MOOCs policies in the USA, UK, Canada, South Korea and Turkey and found that each had policies of varying forms to promote the development and use of OER and MOOCs. Although policies were in place it was also the case that multiple initiatives existed at both local and international level which did not constitute policies necessarily, but represented coordinated approaches.

A European Framework for the Digital Competence of Educators proposes that a key competence for all educators is "to effectively identify resources that best fit their learning objectives, learner group and teaching style, to structure the wealth of materials, establish connections and to modify, add on to and develop themselves digital resources to support their teaching" [Redecker, 2017]. Understanding open licenses and the use of OER is stated as a key means to realise this.

UNESCO (2017) made OER a central method for realising their Sustainable Development Goal 4: Ensure inclusive and quality education for all and promote lifelong learning, with the 2017 Ljubljana OER

action plan. This sets out five actions to mainstream OER, including the development of supportive policies.

This is not intended as a comprehensive review of policies, but highlights the mainstreaming of digital scholarship, and particularly practices associated with openness, have been both driven by, and have led to the formation of, related policy.

Network identity

Perhaps the area of digital scholarship that has seen the most growth, both in terms of practice and associated research, is that of networked, academic identity. Veletsianos and Kimmons refer to Networked Participatory Scholarship (NPS) to encompass scholars' use of social networks to "pursue, share, reflect upon, critique, improve, validate, and further their scholarship" [Veletsianos, Kimmons, 2012].

Some of the proposed benefits anticipated in 2011 are being evidenced now. For example, Stewart notes that establishing a networked identity increases visibility for pre-tenure academics, and this increased network and impact offers some protection in a climate of precarious academic labour [Stewart, 2016]. In her study, she found that "among the junior scholars and graduate students in the study, opportunities including media appearances, plenary addresses, and even academic positions were credited to longterm NPS investment and residency, and to resultant online visibility". Lupton reports that academics often use social media strategically to establish networks, share information, publicise and develop research and provide and receive support [Lupton, 2014]. Similarly, a study of academic bloggers [Mewburn, Thompson, 2013] found that they address academic work conditions and policy contexts, share information and provide advice, operating a form of 'gift economy'.

These new identities can be in conflict with traditional ones, as Costa argues, stating "Higher Education Institutions are more likely to encourage conventional forms of publication than innovative approaches to research communication" [Costa, 2013; p. 171]. She also identifies that digital scholars adopt a 'double gamers' strategy whereby they slowly implement cultural changes to practice while simultaneously engaging in traditional practice to remain relevant within their institution [Costa, 2016].

However, researchers are also increasingly identifying the negative aspects of networked scholarship. Stewart comments that "network platforms are increasingly recognised as sites of rampant misogyny, racism, and harassment" [Stewart, 2016]. The benefits of social media use may not be evenly distributed, for example Donelan reports that the perceived number of successful outcomes, including contributions towards career progression were associated with increasing levels of activity [Donelan, 2016]. For all their potential to democratise the online space, social networks frequently reflect and reinforce existing prestige, with higher ranked universities having more popular Twitter accounts [Jordan, 2017a] and Professors generally developing larger networks than

other positions in higher education [Jordan, 2017b]. While the use of social media is frequently recognised and encouraged by universities, Costa suggests that "this apparent freedom for individuals to re-invent the logic of academic practice comes at a price, as it tends to clash with the conventions of a rather conservative academic world" [Costa, 2015; p. 194].

The online academic then has to negotiate two worlds simultaneously, which can have different modes of operation and value systems. As Costa puts it, they end up playing two games. There is however, a trend to some coalescence of these forms with increasing recognition of the value of network identity in achieving scholarly goals, although most remuneration is still linked to traditional outputs such as published articles and successful research grant income. This is in contrast with the online world which determines prestige through identities and attention [Stewart, 2015a].

In developing these sometimes distinct identities, Ewins uses the postmodern term 'multiphrenic' to describe the multiple identities authors project [Ewins, 2005], with perhaps a different one for their discipline, campus based persona and their online persona. It is mistaken to view any of these as a 'true' identity, but rather they project different aspects of the individual, which are related to the social norms of that context. Dennen points out that at the genesis of a blog, the academic must make decisions about that identity [Dennen, 2009]: what type of tone will the blog adopt? What topics will it cover? How much of the author's personal life should they reveal? She suggests that, just as on campus there exists a set of social norms, so it is online, and the blogger responds to these. These identity norms spread across the highly connected blogosphere "based on a viral movement of individual actions across blogs". This becomes particularly problematic as social networks tend to blur the boundary between professional and personal lives [Veletsianos, Stewart, 2016] making it difficult to separate the two.

Criticality in Digital Scholarship

Following on from the recognition of the drawbacks of developing an online identity, is the last of the major trends, which is a growing body of work that examines digital scholarship through a critical lens.

This comes in different forms, but one prominent strand is suspicion about the claims of educational technology in general, and the role of software companies in particular. One of the consequences of digital scholarship and open practices entering the mainstream of education is that they become increasingly attractive routes for companies to enter the education market. Much of the narrative around digital scholarship is associated with change, which quickly becomes co-opted into broader agendas around commercialisation, commodification and massification of education.

For instance, a report on change in higher education argues that systemic change is inevitable because "elements of the traditional university are threatened by the coming avalanche. In Clayton Christensen's

terms, universities are ripe for disruption" [Barber et al, 2013]. Christensen's concept of 'disruption' [Christensen, 1997] is closely allied with a Silicon Valley Narrative [Weller, 2015] which seeks to ally technological change with wholesale sector reform, usually to the benefit of new market entrants. Education, perceived as slow, resistant to change and old-fashioned is seen as ripe for disruption with Christensen, Horn and Johnson, stating that "disruption is a necessary and overdue chapter in our public schools" [Christensen et al, 2008]. Watters argues that disruption has become somewhat akin to a cultural myth amongst the software industry [Watters, 2013]. This was much in evidence with the rhetoric that surrounded MOOCs for instance, which were proclaimed as a revolution in higher education, but have since been found to appeal to only limited demographic set of learners.

Increasingly then digital scholarship is reacting to these claims about the role of technology and is questioning the impact on learners, scholarly practice, and its implications. For example, while learning analytics have gained a good deal of positive coverage regarding their ability to aid learners and educators [eg. Toetenel, Rienties, 2016], others have questioned their role in learner agency and monitoring [eg. McCarthy, 2016] and their ethics [Slade, Prinsloo, 2013]. Lupton, Mewburn and Thomson caution that overzealous use of data underestimates some of the implications because "data are used to establish norms against which people (teachers and academics as well as students) are measured and judged" [Lupton et al, 2017].

Selwyn argues that engaging with digital impact on education in a critical manner is a key role of educators, stating "the notion of a contemporary educational landscape infused with digital data raises the need for detailed inquiry and critique" [Selwyn, 2015]. This includes being self-critical, and analysing the assumptions and progress in movements within digital scholarship. For example, Gourlay argues that open education, despite its ideological position of being anti-hierarchical may in fact reinforce existing structures, perpetuating "a fantasy of an all-powerful, panoptic institutional apparatus" [Gourlay, 2015].

Digital scholarship research then has begun to witness a shift from advocacy, which tended to promote the use of new technologies, to a more critical perspective. This is in part a consequence of the previous themes, as digital scholarship becomes part of the mainstream and openness leads to a more public profile, then the impact of those practices becomes more significant. This is allied to the social impact of technology and the role of education itself within that society.

Revisiting Boyer

Using these five themes of change in digital scholarship, it is possible to revisit the Boyer categories, and highlight relevant digital scholarship examples for each of the five themes against the four Boyer categories. For network identity Stewart analyses academics' use of Twitter against Boyer's four categories, finding that for each there are rich ex-

amples of digital scholarship, for example use of Twitter "draws scholars from multiple disciplines and geographic areas together via conversations and hashtags emerged as a clear manifestation of scholarship of integration" [Stewart, 2015b].

For discovery, the development of digital methods, such as data visualisation and their consistent application is an example of mainstreaming, and similarly research methods that make use of open approaches, such as analysing open data, social media analysis, crowdsourcing, are example of the shift to open. Policy is evidenced through open access and data policies, and the role of network identity by researchers' use of their own blogs, video, and social media to disseminate, collaborate and conduct research. Criticality can be seen with concerns regarding the pressure on scholars to develop online profiles to effectively engage in research.

The scholarship of integration can be realised in different forms, but one aspect is interdisciplinarity. As with discovery, mainstreaming is evidenced by use of digital approaches to facilitate interdisciplinary research and its broader recognition. Openness is seen through activities that rely on open practice to foster interdisciplinarity, such as accessing open resources from multiple domains, or combining and analysing data sets from different fields. The role of networked identity is seen with the use of hashtags, following individuals and conferences online that are beyond your own discipline, and the role of scholars who act as bridging nodes between disciplines in social media. Criticality is evidenced with concerns around privacy if data is analysed in unexpected ways, and the role of academics in promoting monitoring of students and each other.

The scholarship of application is one that benefits across many of these themes. There is a growing recognition of the role of online public engagement as part of mainstream practice, which is often established around the development of open resources of public value. Much of research policy gives increasing weight to the concept of impact, and this is often realised through online interactions and analytics. Network identity is central in this, and is seen with an increasing separation of the academic's online identity from their institutional one, and the establishment of what is termed a 'personal brand'. A consequence of this however is the rise of online abuse and the specific targeting of individuals by extreme groups, preventing rational online discourse.

Lastly, the scholarly activity of teaching has seen considerable change across these five themes. Mainstreaming can be seen through the use of online and blended teaching approaches, even at on campus universities. More interestingly, the shift to open has seen the rise in use of OER and MOOCs, and also an opening up of methods of recognition with digital badges and accreditation of MOOCs. Policy work has seen the development of national, regional or institutional policies relating to digital curriculum or the use of OERs. Network identity has seen academics use their online networks in teaching, and also to develop students' online identities as part of a digital literacy framework. There are several areas of critical research in this area, including the

neoliberalisation of the university [Hall, 2013], the data showing that MOOC learners are generally already well educated [Edinburgh MOOC group, 2013], and concerns around automation and analytics [Watters, 2017].

Conclusions

While this paper has focused on areas of change since the original 2011 publication of *The Digital Scholar*, it is worth indicating that much has remained unchanged also. The 'approach with caution' attitude towards digital scholarship that was prevalent in 2011 still prevails to an extent. Esposito reported "a cautious interest in Web 2.0 tools to support inquiry activities" [Esposito, 2013] and Gruzd, Staves and Wilk (2012) found that most research institutions do not make use of online profiles when considering promotion [Gruzd et al, 2012]. Suspicion towards digital scholarly practice still persists, for example Thomson claims that some PhD supervisors advise students that they should not cite blogs [Thomson, 2017], and Stewart notes that "digital practices tend to remain on the margins of the tenure and promotions systems by which academia defines itself" [Stewart, 2015b; p. 319].

What has been realised then is not so much a revolution in academic practice, but a gradual acceptance and utilisation of digital scholarship techniques, practices and values. This means that depending on your particular perspective, it can seem to be simultaneously true that radical change has taken place, and nothing has fundamentally altered. Much of the increased adoption in academia mirrors the wider penetration of social media tools amongst society in general, so academics are more likely to have an identity in such places that mixes professional and personal. There has also been an increase in academic specific sites such as Academia.edu and ResearchGate. Academia.edu (2017) report over 58 million registered users in 2017, an increase from 9 million in 2013. The combination of these two factors means that academics are more likely to have some form of online identity and be accustomed to online sharing and networking even in a limited capacity.

This broad, but not necessarily fundamental, increase in digital scholarly practice is represented in the five themes outlined in this paper. The general increase and uptake has led to mainstreaming and acceptance of practice, but this tends to be when it is complementary to established scholarly practice. For example, open access and dissemination via social media aid citations, which are metrics recognised in traditional scholarly practice. Similarly, open approaches and network identity can lead to collaborations, keynote invitations and funded research. Even criticality of digital scholarship can be viewed as an inevitable consequence of the other four themes, as these provide a body of practice to critique and react against.

The relationship between digital and traditional scholarship is best viewed as one of dialogue and interaction between the two, rather than competition and revolution. Using these five themes provides a model for considering how this symbiotic progress will develop. Mainstream-

ing, the shift to open and policy development will act as drivers for the uptake of digital scholarship across all aspects of Boyer's framework. Network identity can be seen as the lived experience of these drivers for many scholars, which can act as both an inhibitor and promoter of further uptake. Criticality provides a much needed check on unquestioning adoption, and analysis of the impact on learners and scholarly practice. This creates an essential feedback loop, the adoption of digital scholarship practices should not be viewed as a progressive scale of improvement, but rather an ongoing adaptation of what tools and practices best suit the needs of academics, learners, higher education institutions and society collectively. Boyer's (1990) plea that 'What we urgently need today is a more inclusive view of what it means to be a scholar' is still true in 2018.

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