Power and politics in a changing scholarly communication landscape

Laura Czerniewicz
University of Cape Town, LAURA.CZERNIEWICZ@UCT.AC.ZA
THE CHANGING DIGITALLY-MEDIATED SCHOLARSHIP LANDSCAPE

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Associate Professor Laura Czerniewicz, University of Cape Town

INTRODUCTION

In recent times the nature of scholarship has both remained consistent to its core principles, and undergone profound changes. Despite numerous high-flown claims, no-one knows how these will play out. This paper describes the digitally-mediated changes which are in process throughout the familiar scholarly cycle, and considers the issues – including for librarians, curators and scholars - which arise from these changes.

The term “scholarship” is used in recognition of the various activities undertaken by scholars, acknowledging an academic model which sees scholarship as complex and multi-faceted. In this regard Boyer’s\(^1\) four types of scholarship are useful: the scholarships of discovery, of integration, of application and of teaching and learning. The scholarship of discovery that includes original research that advances knowledge. The scholarship of integration involves synthesis of information across disciplines, across topics within a discipline, or across time. The scholarship of engagement goes beyond the service duties of a faculty to those within or outside the University and involves the rigor and application of disciplinary expertise with results that can be shared with and/or evaluated by peers. The scholarship of teaching and learning involves the systematic study of teaching and learning processes and requires a format that will allow public sharing and the opportunity for application and evaluation by others. All these types of scholarship are part of a scholarly identity.

\(^1\) Boyer, E (1990) \textit{Scholarship Reconsidered, Priorities of the Professoriate}
TRADITIONAL SCHOLARSHIP

The traditional knowledge creation and dissemination cycle is familiar.

Figure 1: The scholarship landscape in the form of the traditional research cycle, varying to some extent by academic discipline

The typical scholarship cycle has core elements in most disciplines. These may play out differently, and in discipline-specific ways, and of course there are always exceptions to the generalities. That said, scholarship can be described through the familiar form of the research cycle.

It is usually understood to start with the conceptualisation of an issue, problem or focus which involves proposals, literature reviews and possible collaborative processes. Iterations of these take place, either through individual reflections or collegial negotiations. The process is private, and any discussions which take place are would only be available to the individuals involved. Any content produced at this stage – such as bibliographies, literature reviews or proposals – is likely to remain private, and is stored in the offices of the authoring scholars.

The conceptualisation phase is usually followed by some form of data collection, which can be differentiated by being laboratory based or non-laboratory based. It can also be differentiated by being located in the STEM (Science, Technology, Engineering, Mathematics) disciplines or in the Humanities and Social Sciences. Whatever the form of collection, there is a process of data analysis: qualitative, quantitative or mixed method. The data collected may take several forms, many of them not digital. For example, notes may be taken on paper, interviews filmed and laboratory specimens collected. Such data is stored in various ad hoc ways, once again, in a scholar’s office or laboratory. The analysis phase is likely to be private, shareable by request. The methodology is summarised, and mediated by the researcher and/or research assistants.

The analysis leads to findings which are reported in discipline-specific ways. Many disciplines favour journal articles, some (like Computer Science) prefer conference proceedings, and many (e.g. in the Humanities) prioritise books or monographs. These outputs are stable, text-based and considered the final authoritative version. They are sold either via subscription in the case of journals, or as individual items. The dissemination process is almost always the responsibility of publishers; in fact,
dissemination by scholars themselves may not be “counted” for reward and promotional purposes. Publishers may be commercial companies, or professional societies. In both cases it is the norm for scholars to sign over the copyright for their work in return for dissemination.

The data and the methods of research are generally summarised in these outputs, as space prohibits sharing the actual data, and format make it impossible for methods to be viewable. At this point the process may cease.

However, it may also be the case that the research undertaken feeds into the teaching that scholars do, in which case the cycle continues in the engagement phase. And, for those scholars active in social engagement and the popularisation of their research, there may also be a translation phase of the research process.

It is rare for the actual research processes to be shared either within a community, or publically, in this traditional model. Also, the audiences for that content which is made available tend to be quite clear cut, and narrowly aimed. It is fairly difficult for audiences to get access to content that is not intended for them, with the obvious case being non-university based communities who do not have access to university library resources.

So far, so familiar.

![Figure 2: Content and communication in a traditional scholarship landscape](image)

**NEW TERRAIN: THE AFFORDANCES OF DIGITAL CONTENT AND COMMUNICATION IN SCHOLARSHIP**

The term “affordances” is used in a number of fields including human-computer-design, eLearning, psychology, industrial design. It is highly contested but persists because it is sufficiently useful to
researchers as a way of describing the properties and possibilities inherent in a technology or a mode which makes certain uses and behaviours possible and others unlikely or impossible. Affordances describe how the characteristics and qualities of different technologies can be instantiated in different contexts, and through users’ individual preferences and interactions. It is the affordances of the digital which shape the possibilities of new practices. Suggesting that they cause them would be too technologically deterministic, because existing scholarly practices and the possibilities of new technologies co-construct new practices.

Digital content is different from analogue content in several ways, which are explained by many authors in the new media and digital humanities terrain. For the purposes of changing scholarship, only some key attributes need be touched on.

A foundational element of digital content is that it can hyperlink, which has profound effects on how reading happens, on the organisation of material and on learning design. It makes linear progression much more difficult, and reading more lateral and dynamic.

Increasingly, online content is device agnostic which means that it can be read, uploaded to, or downloaded from multiple devices, such as tablets, phones and computers. This is unlike analogue content which is bound up with printed paper.

Digital content is granular which means that it can be represented in different chunks of different sizes, and can be taken apart, unlike analogue content which is consolidated and combined into one unit that cannot be dissolved. A simple example is a page from a textbook containing text, graphs and images, and which exists in a unified, inseparable manner. In a digital form all the elements can be used separately, and book chapters can be separated from a book as whole. Of course, digital content can also contain multimedia – audio, video and animations – which print content can not.

In essence, components can be taken apart and reconstituted in multiple forms and across many platforms, and in innovative configurations. This can be done repeatedly, with numerous variations, and across different formats, leading to what are known as “mashups”.

In addition, digital components can be analysed and mined by technology, and this can be undertaken in quantities previously unimaginable. This means the analysis of “big” data is possible, as well as visualising data in new ways. It also leads to new types of research enabled by “text mining”.

One of the aspects most relevant to scholarship is the way that content can now be easily engaged with through comments and annotations. Thus the one-to-many broadcast nature of content publishing can shift to a two-way engagement. This means that content can be updated and new versions easily created and put up online. Content thus becomes more dynamic. While this engagement aspect has many positive consequences, it makes it difficult to ascertain which might be considered the authoritative version, if any. Version control and attribution are issues which are barely relevant in the analogue space.

Aligned with the way that content changes in the online space, is how communication changes. The fact that communication is recorded and visible makes it cease being transient, as the discussion itself becomes a form of content. For example, comments on a blog become a form of content potentially as valuable as the original blog itself. New forms of content arise that are hybrids of talking and writing, viz online chat, and this becomes part of the shareable scholarly record. In addition, social media engagement amplifies, extends or morphs the content through, for example, tweets which may
themselves be captured as narratives. Other examples abound, where online conversations through social media and collaboration spaces blur the boundaries of what online scholarship is and looks like.

**Digital Scholarship**

**The changing nature of scholarly content**

The phases recognised in traditional scholarship cycles each change in the digital space, especially in an age of networked computers and the Internet.

At the conceptualisation stage, the activities which have traditionally been private become shared and shareable. The process of developing a relevant bibliography, for example, can be undertaken using social bookmarking software, thus enabling connections with others with shared interests. It becomes possible to develop joint bibliographies – even with researchers not personally known. The power of weak ties, which social media is known for enabling, can be brought to bear even at the outset of a research project.

In the data collection, curation and data analysis phases of research the digital is transforming practice. The ease of online communication has facilitated what has become a growing citizen science movement, especially with the sharing of images and audio, often in real time. Disciplines such as astronomy and ornithology have made great strides here, where data is collected by non-specialist amateurs outside the academy.

As in the conceptualisation stage, the online space makes data shareable, so feeding into the open science agenda of enabling reproducibility. It is also contributing to the transparency agenda, enabling improved quality of data.

The characteristics of hyperlinking and inter-operability means that data is now linkable, extending data sets and types. Data can now be “mined” and text mining or data mining make it possible to answer questions which may previously have been too complex or too time consuming. The computational attribute of repeating monotonous queries without human error also changes the possibilities of data analysis. While high performance computing has tended to focus attention on the sciences, the digital humanities also rely on academic computational possibilities in the data collection and analysis phases of research.

Assumptions about shareable data have infiltrated the policy space, where research funders increasingly require data management plans, and may also require that these data sets are available freely online. New platforms have arisen to serve new needs, and services such as Figshare provide spaces for data sets to be curated and shared online.

At the outputs stage of the research cycle, the digital space has seen the growth of new types of enhanced publications. These may be journal articles which acknowledge the more visual representation form of the web through data visualisation and visual rich representations. They may exploit the multimodality of the web by utilising multimedia, animations, sound and video clips. Other aspects of such publications may be hyperlinks directly to actual references, or links through to data sets. They are also likely to incorporate social media such as sharing via various popular platforms, commentaries or annotations.

The disaggregation possible in the digital spaces is also seeing the shape of journals themselves changing, as “megajournals” with wider disciplinary scopes come into existence, enabling cross-
disciplinary linkages. In these instances, the journal platforms are forms of large thematic repositories. At the same time, the nature of peer review is being challenged through these new types of journals that are able to publish online much more speedily than was previously possible. In addition, journals such as PLOS (Public Library of Science) undertake a “technical” peer review process, which considers only the scientific rigour and robustness, without making an assessment of potential impact. This means a separate pre-publication and a post-publication review process, with the latter impact measured through conversations, downloads, references and so on, this in itself forming another, and different, layer of peer review.

It is especially in this space that changes in policies regarding open access are playing out, as research funders are increasingly requiring that research paid for with their funds be made available freely online. Some are also specifying that these outputs should be shared in a way that enables the contents to be mined, re-used and adapted.

In the teaching phase of scholarship, the digital is making possible new forms of open textbooks and open education resources. Given the granularity possible online, these are made available in different-sized chunks, ranging from whole courses to individual images. They can be remixed, updated and adapted with ease. At the level of the course MOOCs (massive open online courses) are challenging the very delivery models of universities themselves, as access to courses is made freely available to anyone with Internet access.

As for scholar-community engagement, resources produced by scholars which go online are potentially available to anyone with Internet access, thus considerably broadening access to academic resources. This applies not only to text but also to lectures and talks, which are increasingly made available, extending the audience and readership for scholars.

**Open processes, open science**

Digital scholarship sees a blurring between processes and content or products at each stage of the research cycle. The open science movement utilises the affordances of the web to open these processes, as well as the content, to scrutiny. Such scrutiny is especially valuable to other scholars, although it has a parallel function of making scientific processes transparent to students and the broader community.

Open science is often described in terms of three R’s: replicability, reusability and replayability. Because the processes and methods of scientific experiments are shared in a transparent way, this means that they can be replicated, thus ensuring validity of methodological outcomes. By making the processes and outputs freely available online, they all become re-usable, increasing efficiencies. Also, by making tools available for appropriation, they become replayable, thus supporting good quality outcomes and effective methods. Sometimes open science is described in terms of additional R’s: that it should be referenceable (so that all aspects can be cited) and respectful (so that the provenance and lineage of ideas being built on are made explicit).

Open science approaches enable more collaborative scientific endeavors and also support interdisciplinarity. Because of the digital environment, a granular approach is enabled and varying chunks, from tiny to large, can be shared at any point.

Finally, one of the most attractive aspects of the open science approach is the immediacy factor. Traditional science is hampered by slow communication processes with publishing taking as long as a few years. With the granular and transparent approach, scientists may record and share as they go. The digital sphere also allows for instant uploading, without the onerous dimensions of paper printing.
**SOME IMPlications of Digital Scholarship**

Digital scholarship means more than old scholarship in new bottles; it has the potential to change some fundamental aspects of how scholarship itself happens. In the research space it changes the way research is undertaken, analysed, collaborated about, communicated, assessed and evaluated.

**New forms and measures of impact**

As scholarship changes and is increasingly available online in different forms, it becomes possible to ascertain how it is accessed and used in ways that were previously either not possible or were extremely difficult. Not only are scholarly objects now granular and therefore of different sizes, but their dynamic nature means that they exist in iterations and versions. In parallel with these changes, the rise of social media in both the scholarly and the non-scholarly social spaces sees new forms of communication, and a blurring of the formal and the informal.

In the traditional scholarship space impact is measured in journals, and through citations. The digital scholarship world now includes the new possibilities of alternative metrics. These may well be complementary metrics that exist alongside metrics such as citation counts, and traditional forms of peer reviews. In these new types of impact the overarching measure becomes use and re-use.
Alt-metrics sources can be categorised by usage (e.g. HTML views, PDF or XML downloads); by captures (bookmarks, groups); mentions (blogs, news, wiki sites, comments); social media (tweets, likes, ratings), as well as through citations (in, for example, Scopus, CrossRef, PubMed Central).

These metrics make it much easier to measure relationships beyond the conventional scholar-to-scholar connections, and to ascertain use in the scholar-community arena. This includes government, civil society and the private sector. These metrics are potentially especially valuable for those who take development impact seriously, and seeking to use more nuanced ways of ascertaining research value.

**Scholarly online identity**

While academics have always been networked in disciplinary communities, their online presence and visibility become matters of concern in a digitally-mediated world. It is likely that all scholars have some form of digital footprint in any event, and increasingly, taking control of their online presence becomes a necessary part of a scholar’s identity. As individuals they may wish to differentiate between their personal, professional and organisational identities, online.
The figure above illustrates the six components of online identities. It is evident that it is not only the content which changes form online, but the nature of the scholar’s communication practices does too. In the process the very presence and identity of the academic as a scholar is transformed.

A conscious commitment to an online academic identity adds additional expertise requirements to scholars’ work. It is one of the new skills sets which the digital scholarship terrain introduces.

**New roles and skills sets**

In the pre-digital world, content curation was a specialist skill, undertaken by trained professionals, usually librarians or heritage professionals. With the rise of digital content, two things are happening in parallel: the first is digital-focused curation and preservation activities and workflows, and the second is distributed ubiquitous access to and easy-to-use curation tools in the hands of non-professionals.

Digital-content curation, which includes data and granular chunks of different kinds of multimedia content, and both traditional copyright and new forms of licenses, can be complicated. New curricula are coming into existence to provide capacity in these new skills sets.

Below is an example of the kinds of workflows which are needed for digital content to be preserved and curated in forms that ensure discoverability.
Enabling discoverability has spawned the new business of search engine optimisation. In addition, there are many new technical areas of expertise, ranging from aggregation and harvesting to analytics and impact assessment. Some of these have become run-of-the-mill, but on the whole the technologies in which the work is rooted are new and rapidly evolving. Many technical innovations are being piloted in willing academic communities on a regular basis, and it is not clear how the technical experiments will settle.

At the same time, a multitude of freely available and easy-to-use web-based tools sees many academics taking control of their own scholarly communication activities. Thus scholarly communication is becoming a decentralised and distributed set of activities undertaken by scholars who become what is sometimes called “extended professionals”. Also, while social media is widespread its importance is not yet understood, and its potential role, for example in alternative metrics, is only nascent.

Interwoven in these workflows and new activities are intellectual property and new forms of licenses. These are relevant to research funding contracts, and exist in order for scholars and their institutions to be in a position to archive/preserve/make visible their own scholarly outputs. Also, as the use of open licenses (such as Creative Commons) become more commonplace, it will be necessary to understand how to publish, re-use, adapt and so on, especially when multiple licenses are at play.
What this all points to is the need for capacity development in a whole plethora of skills and activities that have only come into being in recent times in the scholarly arena. The complexity is exacerbated by university structures which are generally characterised by silos and fragmentation.

Within universities the roles of librarians are being reconceptualised to support research dissemination and scholarly communication, and to filter the exponential explosion of digital content. Many libraries are taking over the scholarly publishing function too.

Outside the academy, many academic publishers are rethinking their roles. Traditional publishing skills such as editing remain relevant, and new services such as data management and text mining are coming into existence.

**Disaggregation in teaching and learning**
The nature of teaching and learning in the academy is also potentially challenged in the digital scholarly terrain, as the affordances of the new technologies permeate the three key value points for learners in universities: content, interaction and accreditation. As with other aspects of scholarship these three were tightly coupled and have now become separated. It is through specific forms and filters of content that scholars have provided access to disciplinary knowledge; this is being challenged by new forms of content, wider access to content creation and the emergence of open content. The interaction with scholars and other students has also been uncoupled, especially marked in the massive open online courses. Accreditation, specifically through summative evaluation and certification remains the sole realm of universities as institutions. These changes give rise to questions about the roles of scholars within universities, the nature of the scholarship of teaching and learning in a digital era, and the relationship between the new forms of scholarship across all the roles of the academy.

**Contestation over digital values in scholarship**
Quite often the terms “digital scholarship” and “open scholarship” are used inter-changeably, but they are certainly not the same. While the digital and the Internet enable openness and sharing, they also enable increased restrictions and tighter control. The open access movement is premised on the capability of the web to make it possible to share and download at next to no cost. In the digital space sharing can easily mean multiplying rather than dividing, as making more available takes nothing away from those who have in the first place. Yet the example of libraries and licenses shows how analogue can be more open than digital when hard copy books are bought by libraries and lent out to as many people as they like (until the book disintegrates), while ebooks are controlled through licenses which restrict how often they can be downloaded.

The foundational principles of the web as being open and free is being contested in trade forums and technical meetings, many of which have no obvious connections with scholarship at all. However, many of these contestations are relevant to scholarship because they are technological representations of deeply divergent views of what online content is and should be. One perspective sees scholarly content as a commodity or as a service, while another sees scholarly content as the manifestation of knowledge as a commons, i.e. a resource shared by a group of people, that is subject to “social dilemmas” and underpinned by equity, efficiency and sustainability.

**Change, tensions and opportunities**
At a time of so much change, with new roles emerging, traditional roles disappearing, and with scholarship itself being reconsidered, there are powerful tensions being played out, and great opportunities to be had. Digitally mediated scholarship challenges existing knowledge production and
dissemination systems and provides the potential for new forms of knowledge exchange with participation, production and collaboration taking place in realigned networks. The scholarships described by Boyer become even more important as the nature of discovery, application, integration, teaching and learning changes. Yet while it is the new technologies which afford these possibilities, it is the familiar critical power contestations over who decides, what is done and whose interests are served which will ultimately create the shape of the new scholarly landscape.