

A framework for analysing research types and practices

Laura Czerniewicz, Centre for Higher Education Development,
University of Cape Town laura.czerniewicz@uct.ac.za

Cathy Kell, Department of Linguistics, University of Western
Cape, ckell@uwc.ac.za

Abstract

In this paper we present a framework for examining the changes that are taking place in the research communication practices of academics from four Southern African universities in the wider context of global moves towards open access. We argue that changes in research activity in higher education systems globally, accompanied by the communicative affordances offered by web 2.0 technologies, are having effects on the ways in which scholars are communicating their research. We assess the extent of change on the scholars in the four universities, drawing on data from the Scholarly Communication in Africa Programme (SCAP) in which 23 academics were interviewed about three recent pieces of research. We therefore developed an overview of 70 pieces of research work, from scholars working in universities in Botswana, Namibia, Mauritius and South African. Traditionally scholars have focused on communicating their research through journal articles or monographs and current rewards and incentives systems at universities continue to emphasise this form of scholar-to-scholar communication. However, growing numbers of academics now communicate their work to governments, to industry and to civil society. Developing a systematic picture of the changing practices of scholars in communicating their work is not easy, given the variety of research projects undertaken across disciplines and contexts. Our framework starts off with identifying five types of research projects, which cut across disciplines and the pure/applied distinction. We then examine these in the light of the scholarly communication cycle and its six stages of conceptualization, data collection and analysis, articulation of findings, and translation and engagement. At each stage we argue the importance of considering social relations, audiences and genres. Finally, we consider these along a continuum of degrees of openness.

Keywords

Scholarly communication, researcher practices, research communication, higher education, open access, Web 2.0

Introduction

Research by higher education and communications scholars provides growing evidence of the changes taking place in the field of scholarly communication, both as result of changes in research activity in higher education systems globally (Etzkowitz 2004; Cooper 2009, 2011; Gibbons et al 1994) as well as those offered by the affordances of web 2.0 technologies (Tenopir 2003; Palmer 2005; Thorin 2006; Procter et al 2010; Weller 2011). There is also growing evidence that the research terrain is becoming more open (Van den Bart et al 2013). While attention has been paid to how scholarly communication and libraries are changing as part of a larger ecosystem (Pendleton-Jullian, 2013), it is less clear how the changing scholarly communication system plays out in actual research practices, as scholars go about their academic work. It is important that academics' research communication practices are explored to complement these system approaches. How do we think about these issues in order to investigate and illuminate changing forms of knowledge creation and communication?

This paper describes a framework which was developed to answer three inter-related questions: How can academics' research projects be categorised? What are the research communication practices of academics?

How closed or open are academics' scholarly communication practices? This paper describes the analytical framework which would enable the answering of these questions, as well as the thinking which informed that framework. The analytical framework developed from the conceptual framework used to shape our study through an iterative process with the data collected.

The study on which the paper is based was a part of a broader programme The Scholarly Communication in Africa Programme (SCAP)¹, located in sites in four African universities: the Department of Library and Information Studies at the University of Botswana (UB); The Economics Department/ South African Labour and Development Research Unit (SALDRU) at the University of Cape Town (UCT); the Faculty of Humanities at the University of Namibia (UNam) and the Faculty of Science at University of Mauritius (UM).

Data collection methods included quantitative and qualitative methods and aimed to produce "thick descriptions" of research communication practices with "insider accounts" of day-to-day practices of African scholars as they go about producing, accessing and sharing research. The research methods included a survey², in-depth, semi-structured interviews with a selection of academics, and day-recall interviews with a small number of those interviewed. In each of the interviews, we asked academics to narrate three recent research projects they had undertaken; this provided descriptions of a total of 72 research projects.

Given that these projects came from different universities in different countries and were based in different disciplines we needed to develop a framework, which would enable us to gain an overview of what is happening in scholarly communication in Southern Africa, without imposing generic models about what should be happening, and without being unduly constrained by discipline or context. The analytical framework which we discuss below was developed in order to deal with the range of projects and related communication practices.

The framework

The basis of the framework lies in three choices: the first was the decision to focus on "practices"; the second was to develop a typology of research projects in a way that cut across disciplines and the pure/applied distinction. And the third was to focus on a heuristic of the scholarly communication cycle and how that is changing as a result of the affordances of web 2.0 technologies. This would allow for a closer analysis of the cycle's stages and dimensions, as well as considering degrees of openness.

Practices

The decision to focus on "practices" in "research communication practices" arose from the "practice turn" in the social sciences, and particularly studies in Science and Technology (STS). Practices can be seen as "arrays of human activity" that are materially mediated" and "organised around shared practical understanding" (Schatzki 2001: 2, quoted in Palmer & Craigin 2008: 169). This allows a focus on activities rather than on texts, and differentiates our approach from previous models of scholarly communication such as the UNISIST (1971) model, the Garvey-Griffith (1972) model and Bjork's (2006) model, as well as their later reformulations in Hurd (2000), Sondergaard, Andersen and Hjørland (2003). Each of these models provides heuristics which are process-based and include where texts go and which other groups of people (in addition to academics) take charge of processing and curating material. Texts along a trajectory of dissemination and curation are therefore

¹ SCAP which was established to help raise the visibility of African scholarship by mapping current research and communication practices in four southern African universities and recommending technical and administrative innovations based on experiences gained in implementation initiatives piloted at these universities.

² The survey was prepared with reference to a number of recent international studies undertaken on scholarly communication (Houghton, Steele & Henty 2004; Rowlands, Nicholas & Huntingdon 2004; Rowlands & Nicholas 2006; Proctor et al 2010, Palmer, Teffeu & Pirmann 2009; Maron & Smith 2008). In particular, we drew on Houghton, Steele and Henty's 2004 study, which focused on three key areas of research activity: communication and collaboration; information search and access and dissemination and publication. We adapted these three however, to take account of what we called "stages in the research cycle" (Czerniewicz, 2013).

the key unit in these models, as are the technical channels through which they flow and the spaces in which they are both deposited and communicated.

In our approach the text and its movements were less important than the activities undertaken by the academics and what enabled or constrained their choices in these activities in the wider research culture of each institution. Our work is therefore more aligned with other studies which consider the everyday activities of academics, such as Acord and Harly (2012) who describe how scholars share their work in progress (showing credit, time, and personality as significant barriers to change across disciplines). Although we were interested in all their communication practices, we also found useful studies which examine researcher use of Web 2.0 technologies as part of their research practice such as those by Proctor et al (2010) and Kraker & Lindstaedt (2011). Studies which describe how researchers find and disseminate research, such as by Bulger et al (2011) and RIN (2009) were also of value, because we agree with Palmer (2005) that while undertaking research, scholars are both consumers and producers of knowledge, thus their practices would include both access to content as well as its production and dissemination.

Research types

In order to make claims about academics' research communication practices, we need a way of framing them, especially in ways that may be comparable. The idea of types was helpful given the diverse disciplinary contexts within which our study sites were situated and the diverse research practices of the academics within these disciplines and sites. A typology enabled us to make a situated and fine-grained analysis of the histories, the objectives, the outcomes, the available resources and the social relations of which particular pieces of research and communication around these are composed.

Boyer's definition of scholarship provides a valuable meta-level framework for understanding different types of scholarship. It distinguishes between the scholarship of firstly, discovery; secondly, integration; thirdly, application/engagement and fourthly, teaching. However, we realised we needed more fine-grained ways of distinguishing between the actual types of investigative inquiry that belong in each of these types of scholarship. We found that it may be more productive to outline possible modes or types of knowledge production or 'ways of making knowledge' (Griffiths 2004: 14) which may then 'lend themselves' to greater or lesser extents to forms of scholarly communication. Such types may then be somewhat disciplinary-specific although blurring and overlap would be expected. We settled on Griffiths' (2004:14) typology of five types of research projects, each a general type of knowledge production³, which may then 'lend themselves' to greater or lesser extents to forms of scholarly communication. But we adapted this, drawing on Cooper (2009 and 2011). All quotes in the following section are from Griffiths (2004: 715 – 717).

Discovery

The discovery of "generalizable explanations or theories". Often thought about as curiosity-driven research and mainly thought about as "pure basic research" (Cooper, 2009 and 2010), this type is "characterised by a high degree of codification of the knowledge base", a high degree of "consensus about appropriate questions, methods and analytical frameworks". Programmes of inquiry can take quite specialised narrow forms and are often undertaken by teams with specialised disciplinary expertise. This type is what is often known as empirical research. In southern African universities it is very difficult to this kind of high-level research because of lack of capacity and funding.

Interpretive

This type focuses on the "interpretation of phenomena rather than the search for generalizable explanations". Here, the "knowledge base is less settled... knowledge advance is not necessarily progressive and may even have the appearance of being cyclical in nature", "methodological principles at work here might be described as hermeneutic or subjectivist" and such projects are often undertaken by individuals or pairs.

³ Griffiths calls these "modes of knowledge production" (ibid p13). However, since the work of Gibbons et al (1994, 1997) on shifts from mode 1 to mode 2 knowledge production has been widely used in South Africa, and because we refer to modes of communication as one of our three elements to consider in our cycle, we use the term "type" rather than "mode" when referring to Griffiths' (and our own) work in order to avoid confusion.

As Griffiths notes that while the above two coincide with Boyer's (1990, 1994; Boyer Commission, 1998) scholarship of discovery, a third maps more neatly onto Boyer's scholarship of application and his later concept of the scholarship of engagement:

Applied

Third: This type can be called 'applied inquiry' and is characteristic of vocational or applied fields like engineering, education, social policy, health care and built environment. Such knowledge production is understood to be useful in addressing conflicts, tackling problems as well as meeting the needs of client groups. Research in this type makes use of knowledge derived from the first two and is therefore sometimes viewed as eclectic or derivative. Griffiths argues that these are potentially distinct ways of making knowledge with their own methods and tests of validity. Rigour is derived from relatively direct feedback loops that generally apply when knowledge is being tested in the context of application.

While Griffiths does not outline a type specifically related to consultancy research, which involves the provision of expert advice to clients, he explores how the third type outlined above, applied inquiry, overlaps with consultancy work. Work of this nature is often a source of friction amongst academics and managers, with part of the tension "revolving around whether consultancy generates 'new knowledge'⁴ or is applying accepted ideas and principles to particular cases": (Griffiths, *ibid*: 717; see also Mamdani, 2011). Griffiths (2004:718) argues: "While the legitimacy of the former is widely accepted, many academics are much more suspicious of the latter within the university setting, especially if the public availability of the findings is restricted by the terms of the contract with the clients." However, Griffiths argues that "the clarification and reworking of basic concepts, the testing out of ideas and methods and the application of accepted principles to new contexts" may well "constitute valid new knowledge production of this third, applied kind." (p718)

Integration

This type draws on Boyer's idea of integration, which involved placing discoveries in a wider context, synthesising knowledge from both 'discovery' research and aspects of applied inquiry. We suggest that Cooper's (2009; 2010) work is a useful elaboration of the integration type with the concept of use-inspired basic research (UIBR), emphasising the primacy of basic disciplinary work, but seeing it as "embedded in use-orientation" (p104). Another useful concept relevant to this type of research that Cooper offers is that of the fourth helix, following Etzkowitz's (2004) triple helix of university-industry-government or U-I-G engagements. This helix extends those aspects of universities' missions which refer to development beyond the traditional and narrow dimension of economic development to one which includes social-economic-cultural development. It is particularly useful to African universities which emphasise social development as do the governments of the countries in which they are located (Gray, Trotter & Willmers 2012).

Teaching and Learning

A further and fifth type relates to Boyer's scholarship of teaching and involves critical inquiry into how learning can be promoted. The scholarship of teaching and learning (SOTL) has burgeoned in the past decade in the global North, as well as in many parts of the South, including the universities SCAP worked in. Griffiths argues that the value of this work is not in doubt, more in question is whether it can be regarded as a distinct type of knowledge production or whether it is better seen as a particular form of applied knowledge production.

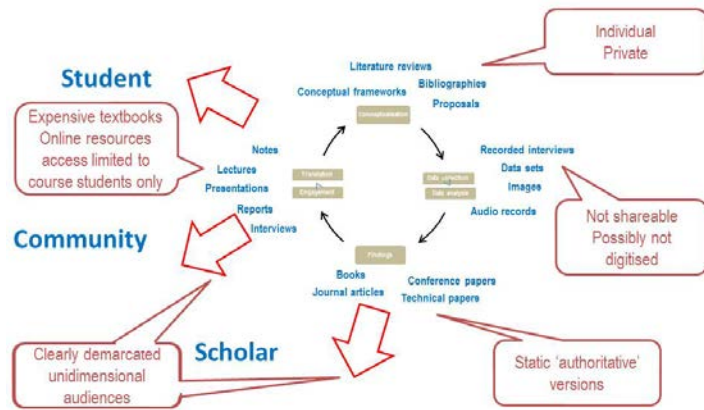
* While the focus of this paper is on the framework rather than its use, it is of note that the taxonomy worked reasonably well in practice⁵ but the categorisation required using two categories for one project at times, as well as the addition of a new category, which we called research infrastructure projects.

The research cycle: stages

We understand research communication to take place throughout the research process, rather than only being part of the formal outputs stage, where traditionally results are published as journal articles. Therefore it was necessary to build a "research cycle approach" into our data collection instruments and into the analytical

⁴ In fact Cooper (2010) states strongly that consultancy work does not involve the production of new knowledge.

⁵ We were able to categorise ten projects as discovery inquiry, sixteen as interpretive; ten as applied with an additional related four as direct consultancies; fourteen as integrated and four as SOTL. There were also five which straddled interpretive/applied; five which straddled applied/consultancy; and six which straddled other combinations. There were two infrastructural projects .



framework (Czerniewicz 2013, Whyte and Pryor 2011). Czerniewicz identifies key features of “the changing digitally-mediated scholarship landscape” through a “knowledge creation and dissemination cycle” model, which takes the perspective of the research and dissemination activities of academics. The model outlines firstly what she calls “core elements” in the traditional knowledge creation and dissemination cycle as: Conceptualisation; Data collection and analysis; Articulation

of findings; Translation and engagement

These can be seen in Figure 1 as the brown boxes in the centre of the circle. Czerniewicz describes the activities comprising each of these stages of work, and touches on the social relations associated with each activity, the audiences, and the genres through which researchers communicate to these audiences at each stage.

Figure 1: Traditional scholarly communication cycle

She then goes on to outline the ways in which scholarly communication is changing at each stage of this cycle, as, with the advent of web 2.0 technologies and the affordances offered by digital forms of content and communication, scholarly work can be shared and communicated by scholars directly into the public domain at all stages of the research process.

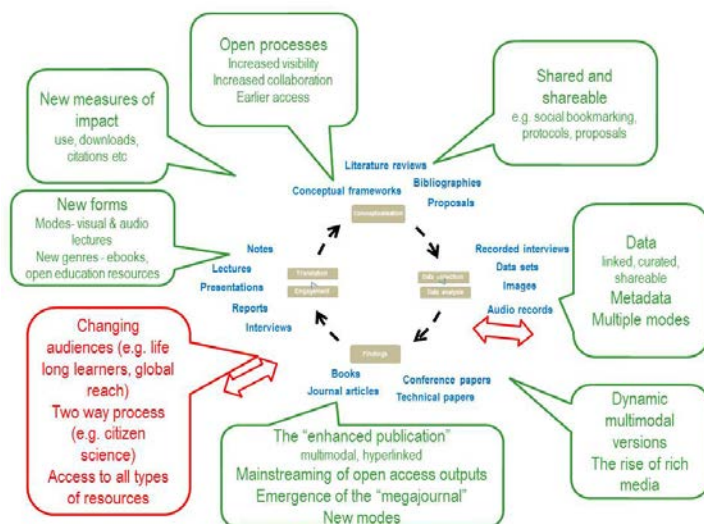


Figure 2: The changing scholarly communication cycle

For the analytical framework, we would need to consider each stage of the cycle, and with our focus on practices, we would need to look at actual examples of how it plays out. Do academics work on clearly defined research projects? Are they able to deepen the knowledge produced in one project by developing a new research project that will enable this to happen? What happens when they are involved in consultancy and applied work? While this heuristic is instantly recognisable to all researchers across every discipline which works with data (both qualitative and quantitative) there are important

differences across disciplines and contexts. How do these differences play out in the messy world of academics trying to plot a path forward as they work to communicate their research?

The research cycle: dimensions

We fine-tune our framework by elaborating on the three elements that come into play at each stage of the research cycle: social relations, audiences/users and forms of communication.

Social relations

In our framework social relations within the stages of the research cycle involves exploring at each point: power relations, including north/south relations; networks, including social networks; the nature of relationships, including positioning as recipients or as contributors.

Power relations in research projects are relevant for knowledge production in terms of who speaks and who is silent, whose voice is heard and in what form. These are deeply shaped within the histories and cultures of the institutions and countries within which the universities are situated. Bourdieu (1998), for example, describes

how in France, academic gate-keeping occurs through for example the control of junior scholars' time in study and acceptance of papers for publication. Halbert (1998) uses Bourdieu's concepts of capital and habitus to explain how knowledge is produced and legitimised as well as to explore the changing dynamics and tensions within the scholarly communication system.

Power relations are also to be considered in terms of north/south relations, especially relevant in this study where many of the academics collaborate with colleagues from the global north, and where the potential exists for global inequalities to be replicated. Social relations in the realm of communication practices must touch on these relationships, as well as on who is able to publish where (see for example Chan et al 2011 and Czerniewicz & Wiens 2013).

These relations extend to the kinds of networks academics have access to, from the most limited within their own departments or universities, extending nationally and regionally, and beyond to global networks. What role do these networks play in their research communication possibilities and practices? Inter-twined with this is the role of social media networks, whether they exist at all and what role they play. These digitally mediated social networks allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system (Boyd and Ellison, 2007).

The element of social relations in our framework therefore refer to relationships of power and control in how research is done, and rather than focusing on products it focuses more on processes, interaction and relationships. How open these relations are is of particular relevance, as described later.

Users/audiences

We need to consider to whom scholars communicate their research and what the nature is of the uptake. We are therefore seeking a more dynamic notion of scholarly communication than the simple sender-receiver model and one which is more closely aligned with the notion of practices, one in which audiences do not simply receive research but are actively involved in 'uptake'. Traditionally scholars' main audiences have been other scholars, and their publishing decisions and outputs have been based on this, with print-based technologies affording this relationship. The Internet opens up and extends the concept of both users and audiences. In the narrowest sense the most conventional way this happens is through the publishing of findings in toll- access journals, reaching only those who have the resources to pay for access to them. Through open access publishing (either green or gold) all outputs are available to those who have Internet, and can extending the potential audience to society at large and meaning that research can be taken up in ways not anticipated by academics.

This framework categorises the following audiences for scholarly communication⁶: scholar to scholar; scholar to student; scholar to community; scholar to government, scholar to industry and scholar to civil society. (See more of this at Gray et al 2009). Audiences in each case may be singular or multiple. Critical to this notion of user-group/audience is the way in which the rewards and incentive systems of universities globally function in ensuring that scholar to scholar forms of communication are valued. These are mapped onto the two diagrams above in the form of the blue arrows in the first diagram, which can be seen to happen only in the final stages of the traditional cycle.

In addition, the notion of audience in a digitally mediated "read-write" milieu is challenged to mean a two-way conversation with the audience "talking back" in the form of comments and discussions, and indeed even circumventing the scholars entirely (Gillmore 2004). Seely Brown (2008) suggests that such a culture of participation involves tinkering, building, remixing and sharing, terms not generally appropriated by the academe.

Forms of communication

With this element of our framework we take into account the forms in which scholars communicate their research. First, we consider the fact that almost the total output of the currently highly valued academic research communication worldwide takes place through the linguistic *mode* of communication, largely through the

⁶ Each of these groups is related to what Etzkowitz (ref) calls the triple helix (scholar – industry – government) and Cooper elaborates further by introducing a fourth helix (community). This, of course, is very relevant in the Southern African context when universities tend to be viewed as needing to play significant and strategic roles in national development.

written word, and to a lesser extent through speech. There are however, other modes of communication and some theorists are arguing that these are challenging the privileged status of the written word (Kress and van Leeuwen 2001) These include visual, iconic, aural, gestural and embodied and spatial modes of communication, amongst others, as well as the multimodal in which these modes of communication mix.

Second, we need to consider the *genres* through which research is communicated. Most simply genres refer to the specific academic outputs which are produced and which are valued. Halbert (1998) notes that the most highly regarded in the scholarly communication system are the dissertation which provides entry to an academic field, and the documents (journal articles) which are relevant for promotion, with others being more peripheral. Yet each genre has different roles and legitimacy which are being challenged as the environment changes. It becomes relevant then to consider whether these are working papers pre-prints, final authoritative versions and so on. These are mapped on the diagrams above as the first ring of terms written in blue and associated with the six stages of the cycle, for example, literature reviews, journal articles, reports, interviews.

Third, the concept of *means* of communication in our framework links closely with our second element of users/audiences and enables us to refer to types of platforms and technologies for communicating and their affordances of commentary and engagement. They may indicate the affordances of the technology expressed as modes of representation. These afford different relationships, and in effect, different types of openness. These may be: One to one – one writer, one reader, no affordance of commenting or changing (eg printed journal article or conference proceedings); One to many /many to one - enables commentary and conversation (blog, Facebook etc); Many to many - Both readers and writers are contributors and participants (eg wiki) .

Degrees of openness

Each of the dimensions can be considered in terms of their degrees of openness, bearing in mind that openness is a widely used concept appropriated for many discourses, with some authors such as Mulder & Jansen (2013) developing schema for differentiating and describing forms of openness in education. the purposes of our analysis, it is important not to take a doctrinaire position on openness by referring to closed practices pejoratively and open practices approvingly. Closed may connote private, and may be appropriate for specific disciplines, at the same time the digital can close down and limit in ways that the analogue does not. Open can connote invasive or exposed, while of course it can also connote collaboration, transparency and inclusiveness.

Furthermore, practices can rarely be categorised in a binary way as closed or open, it is useful to analyse them along a continuum. The concept of degrees of openness is not new; it has been used in relation to open educational resources by Hodgkinson-Williams and Gray (2009) who note too that it has been used for open economies and open source software. It has also been used for open research (RIN 2010), open science (Whyte and Pryor 2011) and most recently for open data (Acuna 2013) and for massive open online courses (MOOCs) (Totschnig, 2013)

Degrees of openness for social relations in research therefore refer to the extent of collaboration on a research project: the continuum therefore extends from: no collaboration – some collaboration - much collaboration. Whyte and Pryor (2011, P.207) referring to the sharing of resources in their study of researcher perspectives of open science, suggest that this continuum moves from most closed - *Private management* (sharing within a research group) to *Collaborative sharing* (sharing between members of a consortium) to *Peer exchange* (sharing on the understanding that disclosure or reuse have conditions attached, between members of a researchers' network of peers) to *Transparent governance* (disclosure to an external party according to a publicly accountable code) to *Community sharing* (access or reuse limited to identifiable members of a research community) *to Public sharing* (sharing where resources are made available for access by any member of the public), with this last being the most open.

The collaboration may refer to both scholars and non-scholars, with one way and two way communication. Also relevant is when in the research cycle research is shared: early in the cycle or later in the cycle (While the current system is set up for late disclosure, studies have shown greater openness leads to larger number of related studies, including by researchers who came from outside the initial area of study. They have also found that open studies have more commercial benefits in the long term, COED 2009). Some of these ideas, suggesting change, are mapped in the green boxes on the second diagram above.

Genres, platforms and technologies include IP provision and rights. A consideration of genres in an open scholarship terrain would evaluate how openly available the research output was, in terms of its legal status.

Proceedings of the 9th International Conference
on Networked Learning 2014, Edited by:

ISBN 978-1-86220-304-4

82

Bayne S, Jones C, de Laat M, Ryberg T &
Sinclair C.

This would mean an assessment along a continuum from most closed or restrictive (with full copyright all rights reserved, to increasingly accommodating through the various forms of creative commons - or similar license - to CC- BY, CC-0 and public domain with no rights reserved).

Finally, we note that much of the work on changing research relationships is being undertaken under the auspices of open research or open science. Open research generally refers to openness in the sense of increased visibility and transparency. Open research, enabled by digital content and ease of online collaboration, is characterised by greater collaboration among researchers and by content being shared throughout the research cycle (from proposal, to data sets, to early sharing of findings etc). By making research available, it supposes increased and increasingly distributed collaboration, and more opportunities for participation.

Conclusion: the framework

This paper describes an analytical framework for researchers' communication practices and explains its development through an iterative process between the initial conceptual work which informed SCAP's research questions, the literature and the process of grappling with data from four different disciplinary areas.. An analytical framework must obviously be applied with due consideration to the unique histories and cultures of each institution studied and the national context in which it exists. Yet we believe that our framework allows for a rich and nuanced account of researcher communication practices as they are transforming, moment by moment; as the nature of research globally changes, moment by moment; and as the world of web 2.0 offers at the same time as it coerces, new ways of communicating the very special form of knowledge that academic research is all about.

References

- Acuna, A (2013) 'Six Degrees of Openness', Keynote Presentation at JISC/ British Library Discovery Summit, 25 February 2013, available at <http://www.slideshare.net/JISC/6-degrees-of-openness>
- Boyd, D. & Ellison, N. (2007), "Social Network Sites: Definition, History, and Scholarship", *Journal of Computer-Mediated Communication*, vol. 13, no. 1.
- Boyer, E.L. (1990) *Scholarship Reconsidered: Priorities of the Professoriate*. New York: The Carnegie Foundation for the Advancement of Teaching
- Boyer, E. L. (1996) The Scholarship of Engagement. *Bulletin of the American Academy of Arts and Sciences* 49(7): 18–33
- Bulger, M; Meyer, E; de la Flor, G; Terras, M; Wyatt, S; Jirotko, M; Eccles, K and (2011) Madsen, C Reinventing Research: Information Practices in the Humanities Research Information Network, Report
- Chan, L., Kirsop, B., & Arunachalam, S. (2011). Towards Open and Equitable Access to Research and Knowledge for Development. *PLoS Medicine*, 8(3), 4. *Public Library of Science*. Retrieved from <http://dx.plos.org/10.1371/journal.pmed.1001016>
- Committee for Economic Development Digital Connections Council (2009) Harnessing Openness to Improve Research, Teaching and Learning in Higher Education insert URL
- Cooper D (2009) University-Civil Society (U-CS) research relationships: The importance of a "fourth helix" alongside the "triple helix" of University-Industry-Government (U-I-G) relations. *South African Review of Sociology* 40(2): 153–180
- Cooper D (2011) *The University in Development: Case Studies of Use-Oriented Research*. Cape Town: HSRC Press <http://www.hsrcpress.ac.za/product.php?productid=2286>
- Czerniewicz, L and Wiens, K (2013) The Online Visibility of South African Knowledge: Searching for Poverty Alleviation, *The African Journal of Information and Communication No 13* available from <http://link.wits.ac.za/journal/AJIC13-Czerniewicz.pdf>
- De Roure *Social Machines of Science and Scholarship* JCDL 2013, 25 July 2013, Indianapolis insert URL
- Etzkowitz H (2004) The evolution of the entrepreneurial university. *International Journal of Technology and Globalisation* 1(1): 64 – 77
- Gray, E., Trotter, H., & Willmers, M. (2012). Scholarly communication in Africa: Aligning strategy and technology for increased visibility of Southern African research. Paper presented at *Emerging African ICTD Research: Learning from Africa*, at the International Association for Media and Communication Research (IAMCR) 2012 conference at the University of KwaZulu-Natal, Durban, 16-19 July 2012.
- Gray, E; Hodgkinson-Williams, C and Willmers M (2009) 'The Opening Scholarship Project: Executive Summary', Centre for Educational Technology, University of Cape Town, <http://www.cet.uct.ac.za/files/file/OS/ExecutiveSummary/Final.pdf>

- Gray, E (2010) Access to Africa's Knowledge Publishing Development Research and Measuring Knowledge *The African Journal of Information and Communication* Issue 10 2009/2010
- Gillmor, D. (2004), "The read-write web" in *We the Media-Grassroots Journalism by the People, for the People*. Sebastopol, CA: O'Reilly Media Inc
- Halbert, M (1998) 'An Analysis of the Internet as a Proposed Medium for Scholarly Communication Using Concepts from Lyotard and Bourdieu', unpublished research paper
userwww.service.emory.edu/~mhalber/Research/Paper/internet.doc
- Houghton JW, Henty M & Steele C (2004) Research practices and scholarly communication in the digital environment. *Learned Publishing* 17(3): 231–249
- King CJ, Harley D, Earl-Novell S, Arter J, Lawrence S & Perciah I (2006) *Scholarly Communication: Academic Values and Sustainable Models*. Berkeley: UC Berkeley Center for Studies in Higher Education. Available at: <http://escholarship.org/uc/item/4j89c3f7>
- Kling R & McKim G (2000). Not just a matter of time: Field differences and the shaping of electronic media in supporting scientific communication. *Journal of the American Society for Information Science* 51(14): 1306–1320. Available at: <http://doi.wiley.com/10.1002/1097-4571%282000%299999%3A9999%3C%3A%3AAID-ASI1047%3E3.0.CO%3B2-T>
- Kraker, P., & Lindstaedt, S. (2011). Research Practices on the Web in the Field of Technology Enhanced Learning. *Proceedings of the ACM WebSci'11* (pp. 1–3). Koblenz, Germany
- Kress, G. and van Leeuwen, T. (2001) *Multimodal discourse: the modes and media of contemporary communication*, London : Arnold.).
- Mamdani M (2011) Africa's Post-colonial scourge. Mail & Guardian online. Available at: <http://mg.co.za/article/2011-05-27-africas-postcolonial-scourge>
- Mkandawire T (2011) Running While Others Walk: Knowledge and the Challenge of Africa's Development. *Africa Development* 36(2): 1–36
- Mulder, F and Janssen B (2013) 'Opening up education' in Jacobi, R; Jelgerhuis, H and van der Woert, N (Eds) *Trend Report: Open Education Resources 2013* SURF Netherlands
- Palmer, C (2005) Scholarly work and the shaping of digital access *Journal of the American Society for Information Science and Technology* Volume 56, Issue 11, pages 1140–1153, September 2005
- Pendleton-Jullian, A (2013) Towards designing an ecosystem of change for the future of the American Research Library, Presentation at American Research Libraries Membership Meeting, Chapel Hill, May 1, 2013
- Procter, R; Williams R; Stewart, J; Poschen M; Snee1, H; VossA; Asgari-Targhi,A (2010), Adoption and use of Web 2.0 in Scholarly Communications *Philosophical Transactions of the Royal Society* Vol.368 No. 1926 4039-4056
- Research Information Network (RIN) 2009, Patterns of information use and exchange: case studies of researchers in the life sciences, Report available at http://www.publishingresearch.net/documents/RINPatterns_information_use-REPORT_Nov2009.pdf
- Research Information Network and NESTA (2010) 'Open to all? Case studies of openness in research'. Research Information Network, London.
- Rowlands I, Nicholas D & Huntingdon P (2004) *Scholarly communication in the digital environment: what do authors want?* London: CIBER. Available at: <http://discovery.ucl.ac.uk/12298/>
- Rowlands I & Nicholas D (2006) The changing scholarly communication landscape: an international survey of senior researchers. *Learned Publishing* 19(1): 31–55. Available at: <http://discovery.ucl.ac.uk/157933/>
- Rowlands I & Nicholas D (2005) Scholarly communication in the digital environment: The 2005 survey of journal author behaviour and attitudes. *Aslib Proceedings*, 57(6): 481–497. Available at: <http://www.emeraldinsight.com/10.1108/00012530510634226>
- Seely Brown J, (2008) & Adler, R 2008 Minds on Fire: Open Education, the Long Tail, and Learning 2.0, *EDUCAUSE Review*, vol. 43, no. 1 (January/February 2008): 16–32
- Tenopir C (2003) *Use and users of electronic library resources: An overview and analysis of recent research studies*. Washington DC: Council on Library and Information Resources
<http://www.clir.org/pubs/reports/pub120/pub120.pdf>
- Thorin S (2006) Global changes in scholarly communication. In HS Ching, PW Poon & C McNaught (Eds.) *eLearning and Digital Publishing*. New York: Springer-Verlag
- Totschnig, M (2013) 'Degrees of Openness in Massive Open Online Courses (MOOCs)' Presentation at eMadrid Conference 17 May 2013, available at <http://es.slideshare.net/emadridnet/2013-05-17-uned-emadrid-mtotschnig-grados-apertura-mooc?>
- Van der Vaart, L; van Berchum, M; Bruce, R; Burgess, M; Hanganu, G; Jacobs, N; Lecarpentier; Pinfield, S and Stokes, P (2013) 'Open' as the default modus operandi for research and higher education, European Proceedings of the 9th International Conference on Networked Learning 2014, Edited by: Bayne S, Jones C, de Laat M, Ryberg T & Sinclair C. ISBN 978-1-86220-304-4

Network for Co-ordination of Policies and Programmes on e-Infrastructures, available from <http://e-infranet.eu/wp-content/uploads/2013/03/e-InfraNet-Open-as-the-Default-Modus-Operandi-for-Research-and-Higher-Education.pdf>

Weller M (2011) *The digital scholar: How technology is transforming scholarly practice*. London: Bloomsbury
Whyte, A and Pryor, G (2011) Open Science in Practice: Researcher Perspectives and Participation *The International Journal of Digital Curation* Issue 1, Volume 6