Reflections on knowledge production within the framework of UK academic institutions

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Introduction
Traditional versus new modes of production

The essay that follows is based on the author's experience gained at teaching within the Higher Education sector in the UK for approximately fifteen years. This period from the turn of the Millennium through the first and first-half of the second decade of the Twenty-first Century has witnessed perhaps some of the greatest changes in knowledge production in recorded memory. While the invention of movable type in Europe in the mid-Fifteenth Century (although of course preceded by approximately four-hundred years in China with the use of ceramic movable materials) and the subsequent invention of the printing press made books more readily available, they were still the preserve of the very rich. The mass population of the UK had to wait until the early to mid-Nineteenth century and the serialisation of fiction (such as Charles Dickens' *The Pickwick Papers*) to be able to benefit from the advances in the technology of printing and economies of mass distribution that made books more affordable (Law, 2000: 34). This arguably accompanied the rise in education and literacy in the Victorian era although this was restricted mainly, but not exclusively, to the male population. Books and education have always been inextricably linked with scholarly research driving academic book production and that in turn fuelling fresh scholarship.

Since the so-called Enlightenment which swept across Europe in the Eighteenth Century, education, for the most part, has no longer been bound

to the state and state-sanctioned religion. Gone were *Ex Cathedra* pronouncements, making way for scientific rigour and the questioning of previous orthodoxy which would be replaced with knowledge constructed through rational argument. Reproducible evidence and method became paramount and hence the need for documented scholarship which would then allow for that scholarship to be cited and built upon. Citing earlier works, whether theory and experiments, where documented experimental method and collaborators facilitated reproducibility, or theory and criticism, where the arguments would be carefully documented in footnotes and reference lists, became the standard for knowledge generation. Academic protocols had been established such that scholarship was now built on existing scholarship and in this way new knowledge could be produced.

> Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it.
>
> When we enquire into any subject, the first thing we have to do is to know what books have treated of it. This leads us to look at catalogues, and at the backs of books in libraries.
>
> Samuel Johnson (Boswell, 1791: 627)

How does this model of knowledge production play out in our new digital and connected world? What is the model for academic scholarship and the academic book of the future? What follows is from a UK perspective only (because that is the limit of the experience of the author) and although the principles apply more widely, and particularly within the Digital Humanities sphere which is where I position myself, it is not intended to be the universal position and may indeed not be appropriate everywhere.

Growth of the social web

Cheap book publication may have allowed knowledge to escape from the confines of the university library or the church and make its way independently into the home, but the advent of the radio arguably had the first great impact. For the first time people allowed an outside voice into our homes with its potential for instantaneous and synchronous mass communication, free at the point of use. The radio had the first-mover advantage and allowed users to welcome mass communication and new ideas into their home; this was before the advent of John Logie Baird's television and educators were quick to see the advantages of both systems. In the UK, the Open University made extensive use of both mediums.[1] Now we have the Internet and all that it brings with it. The development and expansion of the World Wide Web as a medium for the transfer of information has been ongoing since its earliest days at CERN where its visionary invertor Tim Berners-Lee lamented, "It would be so much easier if everyone asking me questions all the time could just read my database" (Wright, 1997). The dissemination of information and the avoidance of interruptions appear to be the main motivation here and following Berners-Lee's words further we find that having created his offspring, he finds it soon becomes corrupted by commercialism: "[t]he idea was not just that it should be a big browsing medium. The idea was that everybody would be putting their ideas in, as well as taking them out." (W3Org, 1999). And that although "the web was driven initially by the group work need, […] the most rapid growth has been […] in public information […]" (Berners-Lee, 2003: xiv) . The focus of the web had moved from being a forum to share ideas and information to become a giant virtual shopping mall; somewhere we go to buy cheap books and movies, book hotels and air-flights. We witnessed the deterioration of what Jurgen Habermas had termed part of the 'Public Sphere' due to the proliferation of commercialised media and the state control of opinion expression (Habermas, 1989).

1. For some background on this, see The Open University: Early Television <www.open.ac.uk/research-projects/historyofou/story/early-television>

Recently we have experienced the growth of what has come to be known as Web 2.0[2] (or the social web), defined in part by the ability for users to contribute content in a many-to-many model as opposed to the previous top-down model of web publishing. This revised format, allowing publishing by users, is far more collaborative in nature and to an extent inverts the former paradigm; as well as publishing material, users now share information and add content by commenting and tagging. Rather than this being part of any technical revolution, it is argued here that this represents a 'social revolution' enabled by technology. The popularity and growth of the social web has been enabled by easy to use software with user friendly interfaces that allow non-technical users to participate by uploading and editing content through their browser window. Special skills are now no longer needed nor the laborious hand coding of webpages followed by FTP (File Transfer Protocol) software to enable the files to be hosted on a webserver. *Facebook*, *Twitter*, *Renren* and *Sina Weibo*, *WhatsApp* and *WeChat* link together millions of users while Instagram and Snapchat allow instant photo and video sharing to document our lives via our smartphones and tablets. We have all, and especially our children, become publishers.

University 2.0

If we consider universities to be major social and cultural institutions, then this position has been established by centuries of research, teaching and publishing in a scholarly manner. Universities are established leaders in knowledge production. How then do they fit in this new model of (almost) instant user generated content? The advancement in technologies has indeed brought new opportunities to institutions of Higher Education both for teaching and learning as well as for publication and the production of new knowledge. They must share in the new challenges to be successful

2. First coined by DiNucci (1999), but popularised by Tim O'Reilly following the Web 2.0 Conference in 2004 (O'Reilly, 2010)

and as well as the traditional campus base of 'brick and mortar' they need to incorporate what might be called the 'click' technology and become 'brick and click' (the traditional campus with distance/online capability) (Kulaki y Mahony, n.d.: 648). The social web and new online infrastructures are certainly popular with the students for networking as well as maintaining and developing their social capital; in addition it does and should bring new dimensions to teaching and learning. New opportunities are there to advance pedagogy by engaging students particularly in the areas of collaborative and group working. Knowledge sharing and knowledge production is facilitated by these new affordances of the social web.

The changing model of Knowledge production in Higher Education

Knowledge production in the academic sphere is dependent upon the publication of staff output and we are now seeing more moves towards openness both within teaching and within publication. Academics within the same university department have always shared their teaching materials. A new member of staff comes in and, as well as developing new modules based on their research interests, will generally take over existing ones and so inheriting much teaching material. This is quite usual but does raise some problems concerning copyright and ownership of that material. This is the case with much course content that we might call legacy data (particularly inherited teaching materials), the origins of which may be long forgotten. This is further complicated by the fact that some institutions claim ownership of any materials produced as part of an employees work practice. Hence teaching materials used by university staff often have uncertain provenance and ownership.

Openness of teaching material can be more successfully formalised if this is planned from the start. For in this way the material can be built up ensuring that all the content is copyright free (and belonging to the tutor as

author) or otherwise copyright cleared with all necessary permissions in place. It is then the decision of the author whether or not to make their material open and freely available. Within the UK and elsewhere (but again I am writing from a UK perspective) this move towards openly publishing teaching materials has been encouraged by many Open Educational Resources (OER) projects.[3] We can indeed trace their origins of the global OER movement back to the UNESCO Conference of 2000; it is important to remember what the initials stand for in this well used and perhaps over-familiar acronym: The United Nations *Educational*, Scientific and Cultural Organisation.

> Open Educational Resources are teaching, learning or research materials that are in the public domain or released with an intellectual property license that allows for free use, adaptation, and distribution (UNESCO, 2017).

This was followed in 2001 with the announcement by the Massachusetts Institute of Technology (MIT) that it would make all its teaching material available in an open repository as OpenCourseWare (OCW). Much further development of open teaching materials in the USA was funded by the William and Flora Hewlett Foundation. In the UK the Joint Information Systems Committee (Jisc) and the Higher Education Academy (HEA) supported a UK initiative to encourage the incorporation of OERs into all government-sponsored education programmes.[4] The UK pilot programme ran from 2009-2010 and focused on demonstrating the 'sustainability of long-term open resources release'. The stability achieved by long-term OER release would allow educators to make OER inclusion a routine part of their curriculum preparation.

The second Jisc funding phase ran from 2010-2011 with the declared objectives to extend the range of materials that were openly available, to document the benefits to the learning process offered by OERs and to enhance their discoverability. One project supported in the second phase was DHOER: Open Educational Resources for the Digital Humanities, which was

3. See for example the OER projects at UCL (http://www.ucl.ac.uk/oer/projects) funded under the Jisc and Higher Education Academy (HEA) Open Educational Resources programme.
4. For more on this see the Jisc pages on OERs (https://jisc.ac.uk/guides/open-educational-resources)

set up to develop a core set of teaching materials within the developing discipline of Digital Humanities and to make them freely available. Because of the wide remit and collaborative nature of digital humanities these would then also support teaching in other related areas across the whole spectrum of the Arts and Humanities, including Information Studies, Library Studies and Cultural Heritage.[5] To make these openly available, the outputs from the DHOER project were deposited in the Jisc funded repository for open teaching material in the Humanities, HumBox (http://humbox.ac.uk), and from there harvested by the dedicated national repository for all OERs, Jorum (www.jorum.ac.uk).

Another important, and relevant to this argument, Jisc and HEA funded OER project at UCL was CPD4HE (Open Resources on HE Teaching and Learning). This developed educational resources to support the professional development of lecturers and all teaching staff at UCL; releasing them as OERs also allowed this to be done more widely and to make these resources available beyond the host institution. The importance here is that, as all probationary lecturers are required to attend and participate in training courses (they are also recommended for the continuing professional development of all teaching staff), using these resources as part of the professional training of academic staff would encourage them to become part of the standard tool-kit of university teaching staff. When these methodologies become more commonplace in the teaching of educators and the development of their research practice, they will similarly become more commonplace in the arsenal of teaching tools employed by course and module tutors. This is important for building a community of practice around OER release and their re-use at an institutional level. Discussions are currently being held at UCL along with the library and institution's research publications repository to set up an institutional repository for OERs and general teaching material.[6] This is not because we need another OER repository (we already have HumBox and Jorum among others in the UK), but rather to

5. Digital Humanities Open Educational Resources (DHOER): (http://www.ucl.ac.uk/dhoer/)
6. UCL Teaching & Learning Portal: OERs (http://www.ucl.ac.uk/teaching-learning/technology/oer/OER-repositories)

make the creation and release of copyright cleared open teaching materials part of the normal institutional practice and the workflow of teaching staff just as Open Access institutional repositories are now mandated in the UK for the research output of all university staff.

The third and final UK OER phase running in 20011 and 2012 funded a series of projects to investigate how OER approaches could work towards particular strategic, policy and societal goals.[7]

The additional effect of releasing teaching materials as OERs is that we now have the opportunity for a new open publishing mechanism for scholarly output which in turn helps to fuel the production of new knowledge through the cycle of teaching and learning and building upon previous scholarship.

Further, the OER movement and initiatives to make teaching material openly available for all potential users is an international one. As well as at national UK educational conferences, I have presented on this topic at the Digital Humanities annual international conference in 2013 at the University of Nebraska - Lincoln. The 2015 Annual Open Education Conference held in Vancouver, Canada with a host of international speakers ran a special strand on OERs sponsored by the William and Flora Hewlett Foundation. I have also taken part in data gathering for DariahTEACH, a European project to develop "open-source, high quality, multilingual teaching materials for the digital arts and humanities" (DariahTeach, n.d.). DARIAH itself is the Digital Research Infrastructure for the Arts and Humanities, a pan-European organisation which "aims to enhance and support digitally-enabled research and teaching across the humanities" (DaraiahTeach, n.d.).

The move to OPEN

The development of Open Educational Resources is only one of many moves towards openness in the publication of resources to create new

7. OER Programme Phase 3 (http://openeducationalresources.pbworks.com/w/page/60792010/OER%20Programme%20Phase%203)

knowledge. As mentioned above, all UK institutions have repositories for staff to deposit their research output (open access is now mandated).[8] These repositories have always been a place where UK universities collect, preserve and disseminate the research output of their staff and represent a significant resource when gathering metrics for measuring the successful output of research active staff. The UK uses these metrics to help to decide how to disperse the limited funds available to support research in universities and this is particularly important in the Arts and Humanities where money is always in short supply. These repositories historically originate from institutional pre-print servers where staff would publish a draft of an academic paper (a PDF or Word document and often before peer-review) before it went for publication and so before the publisher established copyright on the finished work through final pagination and print setting.

The first meeting of the Open Archives Initiative[9] in 1999 established the Santa Fe Convention, to facilitate discovery of content distributed in e-print archives by setting standard technical specifications; scholarship that cannot be found cannot be built upon. This is now discontinued in favour of the Open Archives Initiative Protocol for Metadata Harvesting (The OAI Executive, n.d.). The development of open archives can be traced through the Berkley Electronic Press (BePress), through ePrints (University of Southampton), Dspace (MIT), Fedora and more recently GitHub. The UCL repository, Discovery (http://discovery.ucl.ac.uk), is indeed built on an ePrints installation. Pre-print publications have always furthered knowledge production as they make ideas, methodology and research output freely available and very much in advance of publication. However, they are often difficult to find and do not represent the final published version; often the final polish and editorial proofing is missing and almost always the pagination, hence making citation problematic without the availability of the final print version. They are however, and always have been, available much soo-

8. See for example UCL Discovery (http://discovery.ucl.ac.uk)
9. OAI http://www.openarchives.org

ner and so the results (particularly in many of the sciences where currency is often of great importance) more immediate.

These do not however represent the Open Access movement within which it is possible to identify several important milestones: 2001 the Budapest Open Access Initiative (BOAI, 2001) (in the same year as the launch of MIT's OpenCourseWare and the founding of Creative Commons); 2003 the Bethesda Statement ("Bethesda Statement on Open Access Publishing," 2003) ; 2003 the Berlin Declaration ("The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities," 2003). The Budapest Initiative, arguably the defining event of the Open Access movement, asserted that "The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited" (BOAI, 2001). This coincided with the rapid growth and popularisation of the World Wide Web.

This new move towards open publication of research where academics were 'giving away' the results of their research is, it is argued here, wholly consistent with historical academic practice (publication and citation of sources or the documentation of experimental method) but is a fundamentally different model for the publication of articles of the length and type suitable for journals. E-print servers and institutional repositories require electronic delivery and so are dependent on the Internet. The web (as distinct from and indeed an application running on the Internet) facilitates electronic deposit by upload and delivery by download via a web browser rather than an e-prints email list. This represents a challenge to the financial models of commercial publishers. The costs still need to be covered and so someone still has to pay.

Open Access publishing

Discussions about Open Access publishing are not wholly one sided. For up to the minute comment see GOAL: Global Open Access List (the successor

of AnSci 1998-2011) which is an e-prints mailing list. A forthcoming publication 'Attitudes to Open Access: Analysing Scholarly Discussion in User Forums' (DHQ: Digital Humanities Quarterly) based on the MSc Dissertation of one of my current research students data-mines the content of these discussion forums over time and interrogates them using sentiment and word frequency analyses. The findings indicate the sentiment tendencies as they relate to Open Access within these forums over the past sixteen years.

Following the UK government accepting the recommendations of the Finch Report (Group on Expanding Acess to Published Research Findings, 2012) in 2012, the UK Universities, including UCL, have made Open Access (OA) publishing mandatory for all academic output. One of the main thrusts of the Finch recommendations was to make research articles freely accessible to everyone immediately upon publication. This is in addition to improving the infrastructure of repositories to facilitate upload, discovery and then download. This has now become more pressing as the UK higher education funding bodies have now included an open-access requirement for work that they fund. In addition, the Higher Education Funding Council for England (HEFCE) now has an OA requirement for the 2020 Research Excellence Framework (The Higher Education Funding Council for England, 2018). This means that in future only Open Access publications will be considered for the REF which is the mechanism used to assess the quality of research output and hence the procedure to determine the level of funding that each institution will receive to support their research programmes. They have also taken things one step further by stipulating that their policy requires that the material be deposited in a repository, 'institutional or subject' at the point of acceptance for publication rather than at publication itself: to be considered the material "must have been deposited as soon after the point of acceptance as possible and no later than three months after this date" (The Higher Education Funding Council for England, 2018).

Open Access (OA) publishing as outlined by the Finch Report falls into two categories: Gold OA refers to articles that are released with a fully open publication which is free for the user; the report recommended

a clear policy towards support for Gold OA publishing where publishers are paid by the authors rather than the users and so knowledge generated becomes immediately available to everyone on publication. For Gold OA the publisher makes the content freely available following peer review and plagiarism checks but often also requires an article processing charge (APC). The other model is Green OA which is the self-archiving of an article by the author in their institutional repository (also free for the user). Green OA is similar to pre-print in that the institution makes a pre-publication version of the article freely available in its own repository with no charge for the end user. Both greatly accelerate knowledge production as the research output is available much more quickly as well as being more discoverable. Again, research that cannot be accessed cannot be built upon. Moreover, easier to find research can be more easily incorporated into teaching which is particularly important in a research-led university and, at the same time, these valuable resources are also being archived and preserved for the future.

The UK government has mandated OA publishing for all state funded research, with the rest of Europe and the USA looking lightly to follow. However, legacy publishers are unwilling and, in most cases unable to lower their publication fees and so OA publishing is still very expensive (the average APC charge in the UK is £2000 per article published). However, it also needs to be remembered that, if an article is published OA with one of the major journal publishers, the article processing charge would be on top of the already high fees that are paid by the institutional library for access to that journal. In effect, and until this payment model is changed, the institution pays twice, putting increased burden on already stretched library resources. Indeed, a Government report in 2013 following on from the Finch Report, although welcoming the Government's desire to achieve full OA to increase the availability of published research, argues that Green OA (institutional repositories) should be the focus during the recommended five-year transition period (UK Parliament, 2013). The sustainability of the current double payment method is questionable in the long term.

In the UK, this move to OA publishing has now progressed beyond government funded research. The Research Councils UK (RCUK) announced their new policy, also following the Finch Report, stating that from 2013 all peer reviewed research papers resulting from research funded wholly or partly by the Research Councils "must be published in journals which are compliant with Research Council policy on Open Access" (UK Research Council, n.d.). Further, "the second largest medical research charity in the world, spending more than 600million on science every year", the Wellcome Trust, "plans to withhold a portion of grant money from scientists who do not make the results of their work freely available to the public" (Jha, 2012). Their Open Access Policy "supports unrestricted access to the published outputs of research [they fund] as a fundamental part of its charitable mission and a public benefit to be encouraged wherever possible" (Wellcome Trust, n.d.). This again drives forward scholarship and knowledge production.

These initiatives are not restricted to the UK. The European Commission has coordinated moves towards OA mandate policies across the European Union. The *Excellent Science in the Digital Age* (2015) brochure takes OA publishing a step further and advocates OA to both "data and publications" (European Comission, 2015). This, they say, would 'boost the visibility of European research' specifically by allowing access not only to the latest research results but also the source data. To be clear, this initiative not only publishes the results of research openly but more importantly also the *data* on which that research is based. This brings us back to the situation where method and experimentation can truly be reproducible and hence correctly fit the scholarly model. This is supported by OpenAIRE (www.openaire.eu), the European Open Access infrastructure with the European Open Science Cloud for Research and forms part of the European Commission's Digital Single Market Strategy (European Comission, n.d.).

With a view to making OA publications in institutional repositories more meaningful and discoverable, and hence increase the drive towards knowledge production, many institutions use the overlay journals model. In this scenario, the journal does not create its own content but rather pulls

together relevant publications from institutional repositories under their banner as an umbrella service. Led by UCL, the Jisc funded RIOJA project (Repository Interface for Overlaid Journal Archives) created a tool to support the "automatic interactions between journal software and public repositories" (UK Joint Information Systems Committee, 2008). An example of this type of 'overlay journal' is the UCL, *Journal of Bentham Studies*.[10] This refereed journal pulls together and aggregates content about Jeremy Bentham.

As mentioned above, support for OA initiatives is not universal. Commercial publishers have strong corporate lobbies and in the USA attempts were made with the 2011 Research Works Act (H.R. 3699) to prohibit open-access mandates for government funded research outputs, strongly supported by the Association of American Publishers and the US Copyright Alliance. Following protests and boycotts of its journals a large international academic publisher withdrew its support and the bill was not enacted. So, it's clear that not all publishers favour open access publishing. What we are seeing, however, is a growing number of open access publishers: from PubMed Central and BioMed Central in 2000, and PLoS (Public Library of Science) in 2002; other major publishers began launching 'hybrid' Open Access journals (in essence these are subscription journals that at the same time offer some of their content freely): Hindawi in 2007, Sage Open and BMJ Open in 2010. Closer to my home, Ubiquity Press (www.ubiquitypress.com) spun out of University College London, publishes 'peer-reviewed academic journals, books and data', and importantly in a more cost affordable model. As Ubiquity Press was 'born open and electronic, without legacy costs such as managing subscriptions and print publications' it is 'completely sustainable on APCs alone' with an average APC of only £300.[11] In addition, UCL now has the first fully Open Access University Press in the UK, UCL Press[12].

UCL Press dates back to 1991 but after several years it was sold and licenced to a commercial publisher. In 2013 it was bought back by the institution, launched as a fully OA university press in 2015, and is now a depart-

10. Journal of Bentham Studies <http://ojs.lib.ucl.ac.uk/index.php/jbs>
11. Ubiquity Press Article Processing Charges (http://www.ubiquitypress.com/site/publish)
12. www.ucl.ac.uk/ucl-press

ment within UCL Library Services. It is leading the way forward and taking a more pro-active approach with the institutional led OA publication of not only journals but also monographs; the issues concerning OA publication of monographs were not addressed by the Finch Report and, unlike journal articles, there is no requirement for them to be OA published to be included in the next REF in 2020 (although that may be subject to change beyond that date). In their online statement UCL Press has a focus on 'scholarly monographs, scholarly editions, textbooks, edited collections and journals' and further will seek to:

> use modern technologies and 21st-century means of publishing and dissemination to radically change the prevailing models for the publication of research outputs. Grounded in the Open Science/Open Scholarship agenda, UCL Press will seek to make its published outputs available to a global audience, irrespective of their ability to pay, because UCL believes that this is the best way to tackle global Grand Challenges such as poverty, disease, hunger. [13]

The publishing model of UCL Press remains OA with journals available freely online and book distribution online and also via chain bookstores and campus bookshops. Looking at their latest monograph release, *Treasures from UCL* (Furlong, 2015) it is available free to download as a PDF; it can be ordered print-on-demand for £20 as a paperback; it can also be accessed as an "enhanced version" with video and audio, deep zoom for the images, slideshow and internal navigation which is freely delivered via the web[14].

Open Data

Together with the European Union (and I am writing from a Western-European perspective), the next important movement that is gaining momen-

13. About UCL Press (http://www.ucl.ac.uk/ucl-press/about)
14. *Treasures of UCL* 'Enhanced version' (http://ucldigitalpress.co.uk/Book/Article/2/9/0)

tum is the move towards Open Data (see above and footnote #30) which takes us back to our starting point with the Enlightenment and the need for reproducible evidence and method. We need to have the documented scholarship for the source data and the methodology on which published results are based similarly made openly available. This would enable the verification of results and ensure reproducibility. OA gives us the means to reach the widest possible audience regardless of where in the world they might be, free at the point of use. However, we also need open data to make that research as transparent as possible so that it might be verifiable and replicable and so be true to the scientific method. Further, ideally we should also be making use of Open Standards (as with the OERs above) to ensure interoperability between data sets (whether open or otherwise). Open Licencing such as the Creative Commons[15] allow (depending on the licence chosen) for the re-mixing and adaptation of the original work. Similarly with software and computer code; if it is released openly with, for example, the GNU General Public Licence (GNU GPL)[16], it can be built upon and if, ideally, distributed with the code as simple binaries so too is the experimental method reproducible. Open Licensing of content and the use of Open Source software allow and indeed encourage direct engagement with and the re-use of both the tools, methods and published research output. This is not only of benefit to the immediate and well-connected research community but also makes the raw data, as well as the polished research output, available to less well-funded and connected academic communities as well as researchers and developers in less wealthy institutions and countries. The re-use and re-mixing of work brings with it improvement and progress and represents another drive forward in the production of new knowledge.

Within my original discipline of Classics (as the study of the ancient world) and specifically considering Digital Classics[17] as a sub-set of the Digital Humanities (where I now situate myself) we have many explicit exam-

15. Creative Commons (https://creativecommons.org)
16. GNU Operating System and licenses: (http://www.gnu.org/licenses/licenses.en.html)
17. See for example the Digital Classicist (online community) of which this author is a founder member (http://www.digitalclassicist.org)

ples of research projects based on a Linked Open Data model. Pelagios[18], for example, (Pelagios: Enabled Linked Ancient Geodata in Open Systems) is a collective of projects linking together places of the past which is only made possible by the use of open standards, open source software, and open data (Linked Open Data). Pelagios phases one and two are specifically dedicated to classical antiquity as understood in the Anglophone world as the ancient civilizations of Greece and Rome while the third phase, funded by the Andrew Mellon Foundation, moves the same methodology to cover medieval Christian, Islamic and Asian geographic data. Linked Open Data is indeed the cornerstone of what is often referred to as the Semantic Web as it is the mechanism which allows and facilitates interoperability and communication between different datasets. For more on Linked Data and how that may be used to connect disparate data sets using URIs (Universal Resource Identifiers) and RDF (Resource Description Framework) see *Linked Data–Connected Distributed Data across the Web*[19] and the relevant *Digital Classicist Wiki* page[20].

How then do we persuade colleagues who currently struggle with the concept of giving their research output away freely that it is in their interests to make the precious source data upon which that research is based also freely available to others? At UCL we have recently formed the Open Education Special Interest Group (OE SIG) for which I am the co-opted chair. We have two events planned, one is the official launch of the OE SIG with an invitation to other colleagues (particularly representatives from UCL Library Services) to join us, and the other, timed to coincide with International Open Data Day[21], is 'Open Data as Open Educational Resources'[22]. We have engaged a series of expert speakers to present on open education and the place for open data within teaching and learning in an institutional setting. This is a first move towards raising the importance of and lobbying for an open

18. PELAGIOS: (http://pelagios-project.blogspot.co.uk/p/about-pelagios.html)
19. Linked Data (http://linkeddata.org)
20. What is Linked Open Data (https://wiki.digitalclassicist.org/Linked_open_data>
21. International Open Data Hackathon (http://opendataday.org)
22. UCL event: Open Data as Open Educational Resources (https://blogs.ucl.ac.uk/digital-education/2016/02/12)

data repository at our institution. This SIG takes an educational perspective (as we are all educators and researchers in education) and so this enterprise fits within what UCL calls its 'Connected Curriculum'[23], which is an institution wide initiative to involve our students in research as part of their programme of study. As above, conversations have been held previously with regards to hosting an institutional repository for open teaching materials and we hope to kick-start discussions around making research data available via an institutional repository too. Both of these would need to be managed by Library Services and so it is important to have their support. Practically these could both be implemented with extensions to the current ePrints installation that currently hosts UCL Discovery.

The Academic book of the future

It is also pertinent to briefly mention the Academic Book of the Future[24]. This project is funded for two years by the AHRC (Arts and Humanities Research Council) in collaboration with the British Library to look at "how scholarly work in the Arts and Humanities will be produced, read, and preserved in coming years". Moreover, they wish to examine the roles and purposes of academic books to serve scholarship and wider learning. This impacts directly on knowledge production based on published research output from the scholarly community. One immediate output of the project is the recent Palgrave Macmillan publication of the same name (Lyions y Rayner, 2016) This book is freely available as a downloadable PDF or as a £20 hardback direct from the publishers and covered under a Creative Commons Attribution 4.0 International License.[25] What is particularly special about this publication is the speed of the production process; the Palgrave (Macmillan) Pivot group aim to publish accepted manuscripts, of lengths between that

23. UCL Teaching and Learning Portal: Connected Curriculum (www.ucl.ac.uk/teaching-learning/connected-curriculum)
24. The Academic Book of the Future (https://academicbookfuture.org)
25. CC-BY 4.0 (https://creativecommons.org/version4)

of a standard journal article and a conventional monograph manuscript, within twelve weeks.[26] Despite the rigorous review process, the Academic Book of the Future team aimed for the briefest possible time-frame from start to finish and managed to accelerate the publication process into one month (the authorship and reviews took a few weeks longer) to see the finished product in a matter of weeks rather than many months (or even years) and thus greatly speeding up knowledge production.

Another example of rapid knowledge production is a project I was involved in which was instigated by the Open Knowledge Foundation in 2013: *Handbook on Open Data in Education*.[27] This was initiated through a 'book sprint' where interested parties were invited to get together in the same room and, following discussion, to start to collaboratively author a document as part of the LinkedUp project: *Linking Web Data for Education*.[28] The handbook was envisaged from the start as a 'collaboratively written living web document targeting educational practitioners and the education community at large'. The original book sprint was the starting point with the intention that the document should grow and develop over time. Released under a Creative Commons Attribution 4.0 International License, this publication is available freely as an online publication as well as in EPub and PDF versions.[29]

Coda

We have come a long way since the so-called Enlightenment but the principles for knowledge production are the same. We need an emphasis on scholarly method with transparency and the need for reproducible documented research and experimentation as the cornerstones of knowledge produc-

26. Palgrave Pivot (www.palgrave.com/gp/palgrave-pivot)
27. Handbook on Open Data in Education (first edition) <http://linkedup-project.eu/files/2013/09/LinkedUp-D4.6.1-OpenEducationHandbook.pdf>
28. Linking Web Data for Education (http://linkedup-project.eu)
29. EPub version (http://bit.ly/oeh-epub); PDF version (http://bit.ly/oeh-pdf)

tion. In this way scholarship is built on scholarship and new knowledge is generated. Web 2.0 and the possibilities afforded by this and the University 2.0 help facilitate the move towards openness both in the area of publishing research outputs and also for making the source data upon which that research is based also available. This is the next battle and the lines are being drawn. OA is becoming a normal mode of scholarly publication with all the advantages that brings for discoverability and currency. This position now needs to be supported with moves towards Open Data and preferably to Open Linked Data and the use of Open Source software which would facilitate movement to the next phase of sharable data exchange via automated and interoperable systems; the next iteration of the web but one very much anticipated by its inventor, Tim Berners-Lee (Berners-Lee, 2003). Examples have been given above but the main argument here is that we now have the means via the affordances of the Internet and the web, particularly with the move to OA publishing, to greatly accelerate the production of new knowledge; what is still needed is a commitment to Open Data and linked open systems within all areas of scholarship. What is important is not only Open Access and Open Data to achieve the aims of reproducible scholarship in a transparent as possible manner to reach the widest possible audience but also the use of Open Standards for interoperability in conjunction with Open Licensing of the content. Doing so widens the possibilities of the research questions scholars may ask which again will drive forward knowledge production within the framework of academic institutions.

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