Open Education Initial Scoping Study

Author: Davor Orlic
Contributing authors: Clive Young, Javiera Atenas
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Contact: davor.orlic@ijs.si

ABSTRACT

This study reviews the current activities and potential of Open Education (OE) at University College London (UCL), with an aim to make recommendations for policy and strategy interventions. It takes into account international policy frameworks for opening up education in HE institutions and scopes the potential of an OE service. The study suggests the first steps towards a practical and achievable strategy via a clear and practical roadmap. The study links open education to research impact and UCL initiatives such as the Connected Curriculum and Grand Challenges.

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LIST OF ABBREVIATIONS

CC Connected Curriculum
CS Computer Science
EU European Union
GC Grand Challenges
GCSC Grand Challenges Small Grants
GCCU
HEI Higher Education Institutions
IOE Institute of Education
OCW Open Course Ware
OE Open Education
OEP Open Educational Practices
OER Open Educational Resources
REF Research Excellence Framework
SWOT Swot Analysis (Strengths, Weaknesses, Opportunities, Threats)
UG Undergraduate Teaching
VLE Virtual Learning Environment

OVERVIEW

'Open' is becoming an important theme in higher education and is now impacting directly on our research and educational practices. UCL has already implemented open access to research publications via the 2011 UCL Research Strategy and made the further step in in the 2016-21 Education Strategy to develop of an open education resources (OER) service to provide a showcase for UCL education and for student-generated content.

It is appreciated however that 'open' is a multifaceted, challenging and sometimes controversial concept and it was felt important to establish a view based UCL's current mission, initiatives and practices. The study therefore focused on the perspectives of current UCL practitioners of open education with an aim to develop a definition and model of open education that would enable the development of set of local recommendations.

Technology is often seen as the main enabler for the creation, discovery and re-use of open resources, and the prospective of a dynamic digital resource environment is outlined. However the failure of the Jorum national repository this year suggests that the human factors of institutional commitment, clear and cohesive strategy, enabling policies, service support, recognition and incentives are likely to be just as critical. Again we need to investigate, evaluate and specify approaches in all these areas to determine a UCL system.

The main conclusion is that OE can enable and invigorate a common clear ethos of "open" across campus and faculty. Initial research indicates positive reactions to the philosophy of "open" with strong support many (but not all) academic areas. There is an appreciation that there is not a single correct way of doing it. Moreover, OE at UCL can best be introduced by focusing on openness via a set of specific dimensions, such as content, technology, pedagogies, etc.

This report proposes that contemporary open education at UCL should be considered beyond OER and open research outputs and suggests a portfolio of strategic approaches in terms of teaching methods, collaborations between internal and external individuals and institutions, recognition of open learning and different ways of making content available. The study however found is a common understanding already across campus and that OE can underpin the Connected Curriculum and other initiatives.

These outcomes are not intended to be definitive but rather a next step in the institutional understanding of the potential as well as the issues of more open educational approaches. One of the main conclusions is that more specific investigative work needs to be done in terms of the practices and processes to support staff and student production and use of open educational resources.

General recommendations

- Pilot departmental and/or thematic case studies to understand the potential and limitations of OE implementation in a UCL context
- Specify, investigate and evaluate UCL- specific technical approaches
- Develop an integrated strategy for UCL Opening Education
- Establish a collaborative community of practice in UCL Open Education
- Create a portfolio of open educational polices
- Specify and pilot an open education resources (OER) service to provide a showcase for UCL education and for student-generated content

FOREWORD

The objective of this study is to better understand the issues and opportunities associated with open educational resources and processes at UCL. Although attracting increasing attention in the university sector, open education includes many interconnected aspects and perspectives. To illustrate this we start with a fictitious description of a student's learning journey at UCL, with a focus on the Connected Curriculum. One of the recurrent themes of our investigations was how Open education can complement the Connected Curriculum and here contributing to this

experience at its core in terms of the "openness" of the learning process, learning materials and learning space with formal and non-formal approaches. We anticipate the student naturally adopts the idea of "open" as she creates and uses available OER, uses open licensing, publishes her research in Open Access articles, and is introduced to an Open Practice by creating or studying in formal and non-formal environments.

I arrived at UCL and the programme leader and lecturers explained that the journey through my degree had been carefully designed. There would be opportunities for me to choose different modules during each year of study, but at every level there would also be a 'connections' module where we would have guided conversations with an academic tutor about our developing perspectives on the subject. There was even an opportunity for us to be mentored by students in the years above, and to meet alumni and hear about how they are now using their degree.

The primary way of learning in my modules was through active enquiry, which meant there was a focus on thinking about complex questions and how to answer them – how to look at them from different perspectives. I regularly heard about the latest research in the field and had opportunities to question my tutors, many of whom were researchers themselves. I was encouraged to access educational materials from a wide variety of sources, and used these to help me question the ideas I was learning about. By doing that I learned about how different knowledge traditions are created in our complicated and diverse world, and how some voices and perspectives have been marginalised.

A connected 'throughline' of enquiry ran through the centre of the degree programme. This happened primarily through the sequence of 'connections' modules, which were at some point quite flexible and enabled me to build an online and open portfolio of my investigative work. The portfolio can still be accessed by me, and by external audiences. While producing these materials, I was given plenty of freedom to access resources from beyond the university to enrich my understandings of the key topics. Not everything in the portfolio would eventually be counted for the final marks, so I could try things out, even take some risks. At each level of study, alongside the connections module, I also took other modules with more traditional assessments, but the throughline of enquiry was the place where I was explicitly encouraged, by lecturers and by my academic tutor, to make connections across all of the different topic areas covered in the degree.

Through the connections modules, too, I was encouraged to develop my own specific areas of interest and follow them up, using my initiative and imagination. Sometimes I worked collaboratively with a group of my fellow students on campus or across the globe; at other times I worked independently. In my final year, I completed a substantial independent research project, which forms the final part of my online portfolio and really showcases what I can do. I presented my work to first year students and alumni, and also enjoyed hearing postgraduate students present their own research through the departments' research seminar series. That was also a good way to get know other people, both students

and staff.

By the time I graduated, I was confident that I could describe and apply my current knowledge and skills really well. But more than that, I could express confidence in my ability to investigate anything, anywhere, anytime and to make sound judgments about my findings. I could also present those findings in a variety of formats. Because of my active learning, the intellectual choices I'd made and the opportunities I'd taken to work with others and present my ideas to different audiences, I feel empowered to contribute to the workplace and to society, and to speak out with confidence. The whole experience made me the person I am today.

1. INTRODUCTION

This report "Open Education Initial Scoping Study" was initiated by the informal UCL Open Education Special Interest Group and funded by the UCL Digital Education Minor Works programme during June and July 2016. The aim was an *"investigation scoping the potential, practicalities and possible future actions to support open education initiatives across UCL in response to UCL's education strategy"*. The proposed approach comprised a review of current open education activities and actors across UCL (open educational resources and courses, open data in teaching and learning, open textbooks etc.), including connections to the Connected Curriculum.

The intended audience is a variety of stakeholders, including academics, professional services and high and mid-level decision-makers who may be involved in institutional policy and practice support but not directly in (re)designing the details of the strategies and activities. It presents the first step to the creation of open education resources (OER) service for UCL. The approach seeks to create synergies with other UCL initiatives such as the UCL's Connected Curriculum, UCL's Grand Challenges and UCL's Citizens Science frameworks.

This report should be considered in the international context of a growing global agenda promoting open education, as exemplified by "Opening up Education: Innovative Teaching and Learning for all through New Technologies and Open Educational Resources", launched by the European Commission[1] in September 2013.

Open Education supports a range of fundamental educational principles and could be considered a desirable and achievable vehicle in the UCL policy and practice agenda for both ethical and practical reasons.

- It enables the further reduction or removal of barriers to access education at UCL (e.g. cost, geography, time, and entry requirements).
- It supports and enhances the well-established practice of using digital technologies to support UCL education.
- It opens up the possibility of bridging non-formal and formal education on campus, thus merging the digital with the real-life experience.
- A result of opening up education at UCL, even just internally, may lead to better exchange of practice in teaching.

1.1 BACKGROUND TO THE STUDY

To explore the need to increase awareness about current and possible future Open Educational Practices at UCL we identified four main drivers:

1. **Research** - The growing emphasis of research funding bodies on dissemination, engagement and impact on the wider community. This generally involves the development of open licenced materials and open research outputs.
2. **Teaching** - The Connected Curriculum puts a strong emphasis on the students as content creators and research based learning, which could be achieved by the use of open educational resources and open data. This content can help to engage with the wider community.
3. **Outreach** - Open educational approaches have the potential to further enhance the public profile and engagement of UCL via open courses and resources and relate to the 2034 theme of "An accessible, publicly-engaged organisation that fosters a lifelong community".
4. **Service** - The Education Strategy 2016–21 has a stated five-year aim to have "introduced an open education resources (OER) service to provide a showcase for UCL education and for student-generated content, and to bring together internal resources of common interest in support of the connected curriculum".

We knew from earlier informal studies that OE activity at UCL is relatively restricted, its aims are rather unclear and any progress is hampered by a widespread perception that processes are

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[1] EC Communication http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52013DC0654

complex and potentially risky. It was not clear initially what a training and support service to enable the adoption of OE practices would look like.

1.2 IDEAS OF OPEN EDUCATION AT UCL

We were keen to capture current views on open education at UCL. The bulk of the current report is therefore derived from interviews with UCL practitioners with known interest in this area. The first question was how these local perspectives align with wider definitions in the international academic sector.

This year the European Commission[2] stated that Open Education is: *"a mode of realising education, often enabled by digital technologies, aiming to widen access and participation to everyone by removing barriers and making learning accessible, abundant, and customisable for all. It offers multiple ways of teaching and learning, building and sharing knowledge, as well as a variety of access routes to formal and non-formal education, bridging them."*

In general the EC definition paralleled the ethic-driven understanding of the open education concept as expressed by staff members at UCL, one even stating that that "OE is a prime example of what 21st century learning means".

Several interviewees also expressed that nowadays the boundary between university education and someone's professional life is getting blurred in the sense of "where educational information is coming from", especially as changes in the workspace are very rapid. Education, in the past was very distinctive with clear lines and boundaries, meaning that when university finished, student would not access content anymore, whereas today the majority of students work and apply it to their learning. An example is the Computing Science department where there are few boundaries i.e. the line between coding for university, and coding in private life is blurred, combined with unlimited computing power. One academic felt that OE is at its core a principle and essentially means that *"education is a common good and should be available wherever humanly possible to as many people who can access it as possible"*.

OE may be becoming ever more relevant on campus due to the impact of digital technologies which are now deeply embedded in UCL provision, and the opportunities it presents in terms for the current generation of students.

However, the interviews also showed that openness at UCL, although an evocative umbrella term actually has different meanings in different contexts most respondents felt that not all education should be equally open in every respect. Some resources could be more open than others, and the notion of 'internally open' (i.e. discoverable and used inside UCL only) was often raised.

There was widespread enthusiasm for exploring the notion of openness further, not just in the OER area but in UCL's wider research and engagement agenda. For example in the light of UCL's Grand Challenges, it was suggested that OE may extend even further into emerging approaches and real-life industrial/societal challenges where open approaches could provide the foundation for robust, safe, dynamic and fit-for-purpose digital technologies and environments for learning. Looking further ahead, one can even envisage open approaches addressing education where there apparently is none: smart living environments, wearables for smart ecosystems, autonomous vehicles in a connected environment, cloud solutions, mobile technology, learning analytics, educational data, including intelligent municipalities and boroughs, cognitive cities, industry 4.0, etc. Open education may therefore provide a means to engage with fast-emerging development fields.

1.3 RELEVANT PEERS IN THE OPEN EDUCATION SPACE

• **University of Edinburgh**

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[2] Policy Recommendations for Opening Up Education https://ec.europa.eu/jrc/en/open-education

Edinburgh has produced three OER studies on metadata, OER platforms, and practitioner perception with an aim "*to help the University of Edinburgh achieve its strategic priority of transforming the provision of technology supported teaching and learning to deliver high quality online education at scale, across the institution and out into the wider lifelong learning community*". To do this they identified OE practitioners and key strategic partners within the institution, interviewed them, synthesised their comments to identify broad themes, barriers and drivers and then fed this back to the University. This work went on to inform Edinburgh's OER Policy[3].

It also recognises that use, creation, and publication of OERs are consistent with the University's reputation, values, and mission to "make a significant, sustainable and socially responsible contribution to Scotland, the UK and the world, promoting health and economic and cultural wellbeing". Edinburgh is also the main supporter behind Scotland's approach to OER and the Scottish Open Education Declaration[4].

The University's OER vision was also approved through its policy document on 7.01.2016, which is on Open.Ed[5], Edinburgh's one-stop-shop for OER. The vision has three strands, each building on public good by mainstreaming OER production and identifying and opening unique and high quality collections of learning materials with policy and infrastructure to ensure that these OER collections are sustainable and usable in the medium to longer term. Edinburgh therefore encourages staff and students to use, create, and publish OERs to enhance the quality of the student experience, enhance the provision of learning opportunities for all, and improve teaching practices. Edinburgh has also delivered more than 20 MOOCs[6]. One other distinctive feature is that open licencing is considered as a long-term cost benefit, especially regarding sustainability and re-use. *"Not being open is a risk and not being open costs us money",* according to Melissa Highton Director of the Learning, Teaching and Web Services Division, speaking at a distance education conference this year.

- ### MIT - Massachusetts Institute of Technology
MIT is a university more focused towards engineering, but still comparable in its identity with UCL. MIT began its strategy with "open" in 2002 by introducing the concept of OpenCourseWare (OCW)[7], which is a web-based publication of virtually all MIT course content. OCW is open and available to the world and is a permanent MIT activity. Dick K.P. Yue, Professor, MIT School of Engineering describes OCW activities as *"The idea is simple: to publish all of our course materials online and make them widely available to everyone."* The OCW portfolio counts materials from 2340 courses with 200 million visitors. Statistics show that 80% of visitors rate OCW's impact as extremely positive or positive, 96% of educators say the site has/will help improve courses and 96% of visitors would recommend the site.

With the advent of MOOCs, MIT and Harvard University joined interests and funded the edX[8] MOOCs platform. Additionally they used the edX platform for the MITx[9] initiative, delivering MIT courses/modules that have specifically been developed to run on the edX platform. One of their biggest communications challenges has been to understand and then position OCW, edX and MITx for both faculty and the world and MIT hasn't been making this easy because it has not had a clear plan/message. Some of the MITx courses are available to the world and others are only available internally to MIT students. They now offer interactivity and certificates - the MITx MicroMasters[10] in "Supply Chain Management" is equivalent to a coursework of one semester at MIT. Upon attainment of the MITx MicroMasters, learners are eligible to apply for an accelerated, residential, one-semester master's degree program in Supply Chain Management at MIT. Performance in the MicroMasters plays a strong role in admissions.

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[3] UEDIN OER Policy http://www.ed.ac.uk/files/atoms/files/openeducationalresourcespolicy.pdf
[4] Scottish Open Education Declaration http://declaration.openscot.net/
[5] UEDIN OpenEd http://open.ed.ac.uk/about/
[6] UEDIN MOOCs http://www.ed.ac.uk/studying/moocs
[7] MIT OCW http://ocw.mit.edu/
[8] EDX platform https://www.edx.org/
[9] MITx https://www.edx.org/school/mitx
[10] MITx MicroMasters http://micromasters.mit.edu/

Furthermore OCW co-exists with edX and their focus continues to be on an open presentation of the breadth of the MIT curriculum (what and how they teach). Some of OCW's content is used in other free online OE efforts, including edX courses, but also efforts like the Mechanical MOOC (p2pU, OpenStudy, Codeacademy[11]) and what has been called the AutoMOOC[12]. So, MIT is synergistic - but of course there are challenges in explaining this and making sense of how the services work together.

1.4 WHAT IS OER?

Much of the report focuses on Open Education Resources (OER), normally considered a subset of open education with a more pedagogic focus. UNESCO (2012) considered OER as: *"teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions"*. OER can include lecture notes, slides, lesson plans, textbooks, handouts given to students, videos, online tutorials, podcasts, diagrams, entire courses, and any other material designed for use in teaching and learning.

OER is usually associated with four main dimensions allowing: revise, retain, remix, redistribute, reuse. The underlying notion here is that universities are both producers and consumers of OER. As a research university there is a natural focus on the creation of educational resources but encouraging reuse of existing internal and external OERs should not be overlooked. As a first step towards OER adoption we presume that UCL could encourage the uptake of these five dimensions, without having specific production processes and policies, rather than reinforce the creation of OER.

There is a longstanding debate and arguments over the precise definition of OER in the wider community and this is reflected in discussions at UCL. Its dimensions on campus has a number of *implicit* issues that can cause difficulty:

- Focus on *resources*, which is just one component of the educational process
- No agreed *value proposition* in terms of creation of OER
- An *isolation* of OER from wider developments in UCL's online learning delivery
- Feeling of OER being an *endpoint* in the opening process for institutions
- Anecdotal evidence that OER *promotes* academic and research visibility at UCL[13]
- Growing evidence that OER *promotes* lifelong learning and *caters* for diverse learner and learning needs.

The main obstacles identified by interviewees to achieving the mainstreaming of OER at UCL are (in order of relevance):

1. **Awareness barriers** – this specific obstacle was investigated by using a survey (see Appendix II), as it was felt essential to understand faculty attitudes and behaviours towards OER, to provide a benchmark to monitor progress and to identify strategies for training and support.
2. **Technological repositories** – even if faculty were aware and wanted to produce OER they couldn't as there is no central institutional repository at this moment, giving an operational route to support awareness raising mechanisms.
3. **Commercial interests** – this was identified in the majority of interviews. As there are no obvious and established business models around OER, we speculate that only by creating a technical infrastructure, incentive models and high awareness about the benefits of such a process, a "market-place" with a critical mass of users and contributors, with a social network on top, would generate value and monetisation.

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[11] Mechanical MOOC http://mechanicalmooc.org/
[12] Saylor Foundation http://www.saylor.org/courses/phys101/
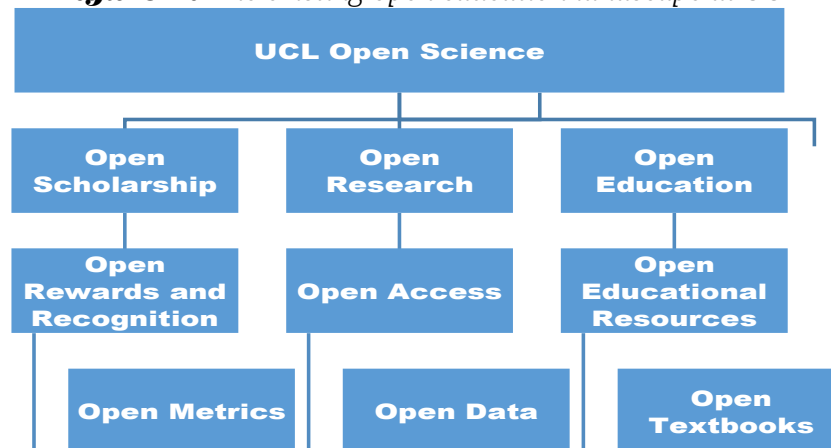[13] OER created within OBL4HE project has put PACE in the centre of the research community

Additional obstacles cited:

4. Quality control
5. Ensuring inclusive and equitable access (discoverability)
6. Capacity of academics, researchers and students to create, access, re-use, share OER
7. Development of appropriate policies
8. Need for UCL clarity on the term 'open'.

2. *OPEN EDUCATION INITIATIVES AT UCL*

Although there has been limited overall coordination around open education, several important and significant initiatives have emerged in recent years that could be included in this term. An initial map of this landscape is outlined below, with examples in the following sections.

Figure 1: *The existing open education landscape at UCL*

2.1 EXAMPLES OF UCL APPROACHES TO OPEN EDUCATIONAL RESOURCES

Examples of current portfolio of open educational projects and services:

- **UCL eXtend - UCL's public-facing e-learning platform**

UCL eXtend[14] is the name for UCL's public-facing e-learning platform, which provides support for a wide range of courses from UCL. It provides the facility for anyone to find a course, register (using their own email and password), pay (optional) and gain access to an online (Moodle-based) environment. Courses may be CPD, short courses, Executive Education, taster modules, public engagement etc. Access to UCLeXtend does not make someone a registered UCL student nor does it provide them access to all internal resources, such as library materials, building access or student support services.

- **LibGuides at Institute of Education**

The IOE's Library Guides[15] (commonly referred to as 'IOE LibGuides') are freely available on the Internet and are openly licensed for reuse by other institutions and libraries for the purposes of teaching, learning and developing research skills. They contain text, images, video, files and RSS feeds which provide background, context and current information, including research, on different aspects of the IOE's library current and historical collections and training.

The IOE LibGuides of which there are over a hundred, focus on curating web content (links on useful resources that can be used by researchers) on different aspects of education research and information skills. The IOE LibGuides on the library's historical collections are used by researchers and students worldwide – the most used guides are 'MACOS: Man A Course of Study' which embeds a documentary video and RSS feeds to bring users up-to-date with current research on the project, 'Early Literacy Attainment' which was created in collaboration with an ESRC research fellow, Professor Gemma Moss, in order to highlight the historical resources she used in her study on early literacy attainment and promote both the resources held by the library and the digital equivalents available online.

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[14] UCLeXtend open Moodle for public https://extend.ucl.ac.uk/

[15] Internet of Education LibGuides http://libguides.ioe.ac.uk/friendly.php?s=newhome

Guides such as how to reference using open source software such as Zotero and Mendeley and on the different referencing standards, Harvard and APA are also popular on the Internet – the Harvard guide has been accessed over 2,000 views since January 2016. The guides are a useful way for the IOE Library to engage with other libraries and users and are seen as a way of imparting the UCL IOE mission on social justice by making information readily available online as an open access and open educational resource.

Completed UCL projects, which gained external funding to develop and release Open Educational Resources:

- **DHOER: Digital Humanities Open Educational Resources**

The DHOER[16] project created Open Educational Resources (OER) from a comprehensive range of introductory materials in Digital Humanities, enriched with multimedia and Web 2.0 components, made freely available to anyone. As well as supporting the Digital Humanities, the DHOER project benefited many cognate disciplines, including the whole spectrum of the Arts and Humanities, Cultural Heritage, Information Studies, Library Studies, and Computer Science.

- **CPD4HE: Open Resources on HE Teaching and Learning**

The CPD4HE[17] project addressed the need to provide varied and flexible support for the professional development of staff who teach in HEI. It released OERs to support professional development with focus on Digital Literacies and Discipline-specific Teaching and Learning. Guidance materials accompanying the resources showed how they map onto the UK Professional Standards Framework and captured the experiences of educational developers and HE teachers who have used them. The CPD4HE project was funded by the HEA and JISC in the OMAC strand of UKOER Phase 2. It ran for one year, from September 2010.

- **Open Learning Environment for Early Modern Low Countries History**

This project[18] was part of the individual strand of JISC's and the Higher Education Academy's Open Educational Resources pilot programme in 2009/10. The project turned a comprehensive survey course in Early Modern Low Countries history into a multimedia and Web 2.0 enriched Open Educational Resource. A special focus of the project was put on relations between the Low Countries and the Anglophone world. The UKOER programme has been designed to support institutions, consortia and individuals to release open educational resources for use and repurposing worldwide, by assisting the development of appropriate processes and policies to make this process an integral part of the learning material creation workflow.

- **VERB: A Virtual Educational Resource for the Biosciences**

VERB[19] is an online teaching and learning resource created by student Alex Lee (Zoology 2009), Dr Helen Chatterjee (GEE) and Mark Carnall (Grant Museum), designed to accompany and enhance undergraduate degrees in the Biosciences. It contains a series of web books outlining the diversity of the animal kingdom from an evolutionary perspective, plus an associated glossary with hyperlinked entries. The topics of focus are phylogeny (evolutionary history) and functional anatomy, but subjects as wide as genetics, ecology, physiology, development, and cell biology are discussed where relevant.

- **OBL4HE: Object-based Learning for Higher Education**

The project created a range of online educational resources for university teachers and students based around the use of museum collections and archival material for enhancing learning. OBL4HE builds on the pioneering work undertaken at UCL on object based learning in the higher education context and the museum-based undergraduate teaching developing research skills at the University of Reading through the CETL-AURS. All of the educational resources are open access under a Creative Commons licence and are intended for others to use and adapt for their own purposes in the education sector. By January 2013 the project has delivered a Source Base of around 140,000 digital objects (photographs of museum artefacts or scanned archival material), which are

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[16] DHOER project http://www.ucl.ac.uk/dhoer/Home

[17] CPD4HE project https://www.ucl.ac.uk/teaching-learning/support/CALT/cpd4he

[18] Object based e-resources http://www.ucl.ac.uk/museums/learning-resources/higher-education/object-based-eresources

[19] UCL pioneers virtual educational resources for bioscience https://www.ucl.ac.uk/news/news-articles/0909/09092301#sthash.isX9T0VN.dpufhttps://www.ucl.ac.uk/news/news-articles/0909/09092301

searchable and accessible for researchers and teachers in universities (and further education institutions) in the UK.

Projects started by students and faculty in degree programmes:

- **Linked Open Bibliographic Data**

A team from Information Studies (DIS) has been awarded an Elearning Development Grant (ELDG) from UCL ELE (E-Learning Environments) to develop a linked open data bibliographic dataset [20] based on BIBFRAME, the new standard for bibliographic records. Being based on RDF – the standard metadata language for the Web – BIBFRAME enables semantically interlinking bibliographic datasets on the Web, and improves the interaction with web users by enabling them to access, retrieve and update bibliographic records online. The aim of this project is to develop a BIBFRAME dataset as an Open Educational Resource, which will help students learn the new standard in an interactive way, and in the same time become familiar with state-of-the art web technologies. An important aspect of the project is working with students from the MA LIS programme to develop and evaluate the resource.

- **Five virtual exhibitions from this year's BASc2001 - Object Lessons**

"Object Lessons" is a second year core module on the BASc Arts and Sciences undergraduate degree programme at UCL. In the second half of term, the students work in groups of six and devise a virtual exhibition featuring their six researched objects. The first step is to develop a theme that can connect the objects and discuss how to communicate this theme through the exhibition. Students need to decide on a target audience for the exhibition and tailor the content to this audience. Whilst they will draw on the content of their object reports in constructing the exhibition, it is important that they make sure the exhibition achieves an appropriate tone and consistent mode of presentation throughout. The virtual exhibition is then licensed with a CC license. The group project itself is worth 40% of the total module mark and the students give an oral presentation on the process of putting together the exhibition, for which they are awarded a further and final 20% of their marks.

Funding from the European Union's Horizon 2020 research and innovation programme

- **LEARN - Leaders activating research networks**

The EU-funded project, run by UCL Library Services,[21] is investigating the level of preparation in research organisations to manage the research data they are producing, especially open data. This is research data which underpins research and educational materials. By producing an exemplar RDM policy, which could then be tailored by any university or research institution to meet their needs, LEARN aims to address the challenges of the Work Programme concerning the fragmentation of e-infrastructures and the need to maximize on global research data.

2.1 OPEN EDUCATIONAL RESOURCES AT UCL

There are no data on the quantity of OERs produced at UCL. Quite a few projects have generated OER content and practices, but a quick search in Jorum [22] (formerly the UK's largest repository for discovering and sharing OER for HE, now closed) shows 192 entries which is actually a small number for a university the size of UCL. There are as many as 100 OERs in LibGuides and in UCL eXtend, but the exact numbers are at this point of the scoping study unknown, therefore we have prepared an "awareness survey" with a section that enables faculty to report on unlisted OE and OER projects. In general we see a strong bottom-up support in OER creation with (currently) stronger desire to create OER rather than reuse, revise, remix, and redistribute. This points to a sorts of import-export model.

The demise this year of Jorum highlights the need for any OER repository to be active and socially valuable. The CS Dept. for example would be reluctant to create OER unless evidence would show that it's being accessed. Thus before creating OER we should have a value proposition for faculty, for example a service that would generate and measure traffic, a sort of market place. The idea is

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[20] Linked Open Bibliographic Data project http://www.ucl.ac.uk/dis/research/collaborativeprojects/lobd

[21] LEARN Project http://learn-rdm.eu/

[22] UCL OER in Jorum http://find.jorum.ac.uk/?q=University+College+London&q-submit=Search

that some kind of social feedback from peers, indicating value and impact would encourage and enthuse academics. This was not possible with a simple Jorum style repository.

The process of depositing in an OER also needs to be easy, such a system could also be pitched to students. For example CS students as in their role of software developers they deployed software systems for Microsoft, JP Morgan, etc. Selection for undergraduate projects has finished, but graduate projects will be presented to students in January 2017. UCL Library Services together with Digital Education could build a suite of resources so that each academic would be informed on the procedures around OERs. If academics embedded this as part of their work and could be encouraged and shown the benefits, activity which would be regarded as part teaching and part research, then it would begin to make sense. Also, they should be able to choose what they want to make open. Staff also cannot exactly quantify the value of its OER, as it shows indirectly in the international contact making. For example UCL PACE is at the centre of their research community, as the network was built around the resources created for their "Object-based Learning Research".

Another example comes from Public and Cultural Engagement (PACE) which has 8000 images in the UCL digital media services repository, open within UCL but not the general public, additionally then they have a shared folder with 3000 images in their Dept. and over 100.00 images created over the time span of 15 years. As there doesn't seem to be a common digitisation strategy at UCL they would be willing to share their content with the general public and copyright would not be an issue as they own all the material.
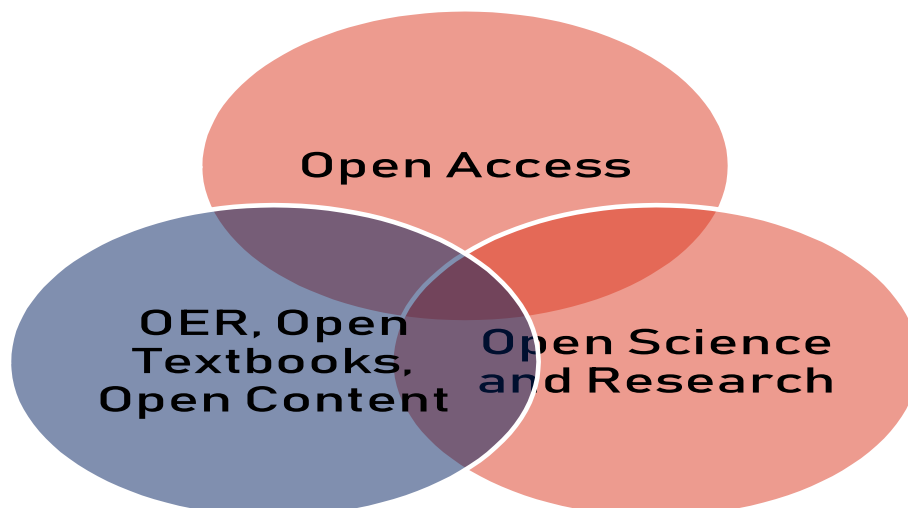
2.2 OPEN DATA AT UCL

Figure 2: *Triage of OER, OA and Open Science / Open Research in UCL*

Open Data[23], is the name given to datasets generated by international organisations, governments, NGOs and academic researchers, and made freely available online and openly-licensed[24] These can be freely used, re-used and redistributed by anyone and the concept is gaining momentum with impetus from publishers and the Research Excellence Framework (REF) and requirements from some research funder, for repeatable and sustainable research. The Connected Curriculum may provide a further opportunity to use open data. Anecdotes suggest that much of it is happening at UCL 'under the radar' - groups and individuals releasing code to Public Library of Science: (PLOS), Figshare and GitHub. In the case of PLOS, the research data is associated with a research paper as complementary file[25] with papers including in their related content datasets associated with the

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[23] Definition of Open Data https://en.wikipedia.org/wiki/Open_data

[24] Atenas, J., Havemann, L., & Priego, E. (2015). Open Data as Open Educational Resources: Towards Transversal Skills and Global Citizenship. Open Praxis, 7(4), 377-389. doi:10.5944/openpraxis.7.4.233

[25] David, A. L., Holloway, A., Thomasson, L., Syngelaki, A., Nicolaides, K., Patel, R. R., Chitty, L. S. (2014). A Case-Control Study of Maternal Periconceptual and Pregnancy Recreational Drug Use and Fetal Malformation Using Hair Analysis. PLoS ONE, 9(10), e111038. Retrieved from

research[26]. In relation to Figshare, the datasets are shared[27] and finally in the case of Github, datasets are shared in the forms of databases and code. As UCL has so many silos and pockets of knowledge that it is very hard to know what faculty in each department are doing, let alone UCL as a whole. In addition there is a UCL Research Data policy[28], and the LERU Working Group which produced the LERU Roadmap for Research Data[29] which provides a lot of guidance and information on Open Data. UCL's current policy and advocacy for RDM is fully in line with the LERU Roadmap enforcing open data publishing. There is not a centralised, single entry point for UCL researchers and academics to share and reuse data, and data stored in within UCL facilities, is not yet directly associated with the research articles stored into UCL discovery and not directly accessible for teaching and learning by linking it with the VLE. However there are examples of good practices, the Bartlett and Centre for Advanced Spatial Analysis (CASA) do some interesting work with Geographic Information Science (GIS) data and have looked into environmental conditions in buildings and their impact on humans – this could be an area where students might want to engage with Estates data for a pilot study. UCL Library Services have appointed an Advocacy Officer for Research Data Management, who is beginning to raise awareness of best practice in RDM and to advise academic researchers how to comply with funder RDM policies a website has also been constructed[30]. With regards to the infrastructure layer (see recommendations), there are some universities that have an open data service, in the UK Southampton[31], in Canada University of Waterloo[32] and Germany Ulm University[33].

Example of a different approach on use of open data at UCL driving OE:

Understanding where resources are currently being used is the first step to reducing consumption. To this end, UCL has joined CarbonCulture platform[34], a community platform designed to help people use resources more efficiently. The first step is measuring and reporting an organisation's carbon and energy performance. UCL currently reports half-hourly electricity and heat data for all of its central campus buildings, as well as monthly electricity data for its smaller ones. Gas consumption data, waste management data, and water consumption data are recorded by UCL Estates and there is a plan to integrate them within this platform soon. By visiting the UCL dedicated page on the platform, staff and students can navigate through the reporting pages, where charts are shown reporting energy use, financial cost, and carbon impact on a per building basis.

UCL has also been developing some Bluetooth sensor modules which can be used to measure environmental conditions in a particular office, and these could be coupled to the energy consumption in that office. It may not be a building wide measurement, but it might be of interest. UCL is mainly interested in (1) experimenting with different visualisations of energy consumptions other than the current web-based 2D charts (e.g., use situ public visualisations, such as interactive displays, projections on building walls and/or on floors in front of buildings), (2) experimenting with different strategies to change behaviours (e.g., using social norms – visualisations that compare a building relative to UCL average; using nudges – visualisations at the point of consumption, etc.), (3) experimenting with different deployment strategies (one

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http://dx.doi.org/10.1371%2Fjournal.pone.0111038

[26] http://journals.plos.org/plosone/article/related?id=10.1371%2Fjournal.pone.0111038

[27] Li, S.-C., Khan, M., Caplin, M., Meyer, T., Öberg, K., & Giandomenico, V. (2015). Serum samples collected at University College London, UK. Retrieved from 10.1371/journal.pone.0125553.t002

[28] UCL Research Data policy at
https://www.ucl.ac.uk/isd/services/research-it/documents/uclresearchdatapolicy.pdf

[29] LERU Roadmap for Research Data at
http://www.leru.org/files/publications/AP14_LERU_Roadmap_for_Research_data_final.pdf

[30] Open Data website http://www.ucl.ac.uk/library/research-support/research-data

[31] Open data at University of Southampton http://data.southampton.ac.uk/

[32] Open data at University of Waterloo https://uwaterloo.ca/open-data/

[33] Open data pilot at Ulm University https://www.uni-ulm.de/einrichtungen/kiz/service-katalog/wid/fdm/open-data-pilot-in-horizon-2020.htm

[34] UCL at Carbonculture platform https://platform.carbonculture.net/communities/ucl/30/

where UCL Estates comes top down, which is what happened so far, vs one where "local champions" lead action, etc.).

2.3 OPEN TEXTBOOKS RESOURCES AT UCL

UCL Press[35] is the UK's first fully Open Access University Press. It is one year old and in its first year of publishing has published 13 books and 3 journals. The Press has started a line of Open Access textbooks, the first being on "Plastic and Reconstructive Surgery" from the Masters course run on the Royal Free campus[36]. The Press intends to develop its offering of Open Access textbooks and this is a major opportunity in UCL to change the current commercial business model for textbook publishing. Commercial publishers are reluctant to releases textbooks as digital books, let alone as Open Access books, because they fear loss of revenue. Open Access textbooks presents the academy with an opportunity to make an offering in the Open space which will open up access to, and use of, textbooks by the end user.

2.4 OPEN ACCESS AT UCL

UCL Discovery[37] is probably the OE flagship at UCL, as it has a very strong presence in the open space, adding 12.000 Open Access publications yearly. The success of the OA model was due to national requirements and the establishment of the UCL Publications Board, chaired by the Vice-Provost (Research) and including senior UCL and Faculty Officers. The formation of the Board marked UCL's recognition of the strategic importance of Open Access to the institution, and it provides high - level championship for the repository. The UCL Publications Board sponsored the UCL Publications Policy[38], adopted in 2009.

The Policy includes the principle that a copy of every UCL research output should be deposited and made freely available in UCL Discovery, copyright permissions allowing. In 2010, Symplectic Elements, implemented locally as the UCL Research Publications System (RPS), was introduced. RPS is a one-stop publications management system, offering UCL researchers the ability to harvest, import or enter publication details; it also provides a simple deposit interface for the upload of full text into UCL Discovery. Academics were able to publish OA – but until the HEFCE REF 2020 policy came out only about 15-20% of outputs had been in full text, metadata was there but relatively few people uploaded their materials to make it OA. By and large it is not an unwillingness to have their materials published in the repository, but rather the stages and process of doing it, going to RPS system and finding the right version to upload. The HEFCE REF 2020 policy, with its OA requirement however, is a game changer for OA in UCL.

2.5 MOOCs AT UCL

UCL has partnered with Futurelearn in delivering six MOOCs. The current production is 3 MOOCs per year with 4-5 week courses, 10.000 enrolments each with 100 enrolments completed. The current creation cost is about £50.000 per MOOC (staff and production costs), which runs three times. These are minimal while still assuring high quality delivery. One of the best performing UCL MOOCs was on "The Many Faces of Dementia" where 500 learners paid for a certificate, and completion rate was 40%. In 2012 when MOOCs were a new trend in the educational landscape, UCL there was a suggestion to develop MOOCs related to the research topics connected with the Grand Challenges, but in the case, themes were chosen by competition. In early 2016, the CS Dept. established its own MOOC recording studio with the idea to create high quality MOOC-type courses as an offering to companies and businesses or to sell as CPD. In general academics are worried about the licenses used by MOOC platforms as they do not allow re-use of materials outside

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[35] UCL Press https://www.ucl.ac.uk/ucl-press
[36] UCL textbooks https://www.ucl.ac.uk/ucl-press/browse-books/textbook-of-plastic-and-reconstructive-surgery
[37] UCL Discovery http://discovery.ucl.ac.uk/
[38] UCL Publications Policy https://www.ucl.ac.uk/library/publications-policy.shtml

of MOOCs, essentially making proprietary resources that were given by universities for free. One of the technical drawbacks of MOOCs is that the resources are stored inside the platform and are not especially discoverable. This is even more problematic with eXtend and the internal VLE, both based on Moodle.

3. POTENTIAL AREAS OF DEVELOPMENT

3.1. CONNECTIONS TO CONNECTED CURRICULUM

There is clearly a conceptual alignment and the potential of synergy between open education and aspects of the Connected Curriculum (CC). **CC Dimension 5**, encouraging students to connect with external audiences through the production of assessment 'outputs' such as journal articles, blogs, presentations, exhibitions or videos is an appropriate starting point. As students learn to produce such outputs, awareness and integration OE practices should be encouraged. Open practice, for example making some teaching resources discoverable outside Moodle, would certainly facilitate **CC Dimensions 3** and **6,** and help students connect with each other, across phases, with alumni, across subjects and out to the world. Surveys suggest students would welcome broader access to resources to explore and interrogate beyond their Moodle courses.

Similarly from the academic perspective, the production by academics of OE resources and the introduction of OE practice in teaching may facilitate both student connection with researchers and with the institution's research (**CC Dimension 1**) and possibly the linking of academic learning with workplace learning (**CC Dimension 4**).

In practical terms this means empowering students on two levels (1) improving access materials that are open to learn, (2) encouraging what they produce to be open in order to show case what they've done, so staff share with students and vice-versa. This could potentially lead to a strategy for mainstreaming OE within the CC, if we were to say explicitly that UCL's ethos for the curriculum is open and we create mechanisms to enable it. This would have implications for student support, academic staff awareness and raise technical questions around Moodle, but the culture would gradually change and eventually staff would see their own benefit as a teacher, researcher, human being, and citizen of London's global university.

UCL Library Services notes that students' coursework outputs are increasingly becoming standalone instances that could be published, for example students in the Arts and Sciences (BASc) - UCL used the "Museums and Special Collections" to curate online exhibitions, which in themselves become little packages that could be OA. Staff notes that it's best to have a workshop at the onset of the coursework for students to understand the pre-requisites and IPR issues.

OE could also be integrated into **CC Dimension 2**, the CC's "throughline" of research activity. This can be built into programmes, and designed into a programme of study with the idea of a throughline working like a tube with an open module at the centre, where students don't need to finish X before Y. This they can have more choice, they can fail, but out of the best things they try, they would need to present at the end their learning, that fits completely with the idea of OE, as students need a place (a 'sandbox') to play in learning and doing, connecting with other people.

> **Example of an approach on usage of OE within CC:**
>
> Staff invite students to try all sorts of things and share with them over that time, have cut-off points to make sure they complete cycles. They would be building a portfolio of what they have done with the knowledge of OA and OE, and from that portfolio they would select the best things that would be representative of their learning output, achievements in that learning programme - these are a set of learning mechanisms. The current problem is if a rational learning experience doesn't fit into a credit scheme, it doesn't exists, but in UCL's case that fits into the throughline. For that we don't have a unified procedure, as it's not a "from the shelf solution", therefore open pedagogies can be applied. A suggestion would be for staff to create a new programme with 30 credits each year, 1/4 of each year's activities, 90 credits, 900 learning hours over 3 years, and think what to make available for students to choose from, so the students are going to be judged by (understanding, skills, audience, work towards undergraduate research conference, etc.), but the idea is to have a space for students to think and go outside the box. In later iterations, think of creating mechanisms for them to collect open badges - that becomes easier, if resources are created "open by default". The second example applies to OER doing courses, if UCL could help them understand how the resources they create can contribute to the economy of things we could create individuals who would think that way from the start.

3.2. CONNECTION TO GRAND CHALLENGES

Although the focus of this report is education, several interviewees mentioned the possible connection between OE and UCL's research profile. UCL Grand Challenges, for example, build their portfolio on research in world's problems, via collaborations across UCL's disciplines, leading to interaction with policymakers, practitioners and community groups (among many others). This seems by default an "open" approach similar to other national initiatives like OpeningupSlovenia[39]. The initiative has impacted positively on beneficiaries in London, the UK, and around the world. Currently they are in a time of transition at the GCs, moving from four (Global Health, Sustainable Cities, Human Wellbeing, Cultural Understanding) to six Grand Challenges (Transformative Technology, Justice and Equality). The GCs portfolio includes around 100 projects, small grants and events.

As GCs are primarily research actions, they are not automatically seen as having a direct connection with education at UCL. Nevertheless current links are represented by 1) an annual summer school for post graduate students, 2) funding GC themed volunteering through the UCL Union Volunteering Services Unit, 3) providing the themes for the global citizenship programme and 4) working with UCL Academy (GCSC students) on GCSC and GCCU themed projects. These might be the first set of opportunities for extending the impact of the GCs by adopting open approaches, and create a bridge between the GCs and the CC. There seems to be a space for using open education mechanisms as an effective vehicle to facilitate student involvement with GCs and OER could be used for maximising UCL's impact and increase international engagement. For example the summer school and accompanying events could be designed in such a way as to create online courses around the GCs themes, impact could be reached by licensing the created data with open licences, and production of specialised but relevant OER could be feasible. An idea had already been floated to develop a series of MOOCs around the Grand Challenges to showcase and emphasise the educational potential of the initiative.

3.3. NEUTRAL AND NON-FORMAL LEARNING SPACES

The Institute of Making is a multidisciplinary research club based at University College London. There is already an interesting open and connected ethos in its implementation and additionally is a space where formal and non-formal learning meet. One could imagine 20 or 30 cross-cutting-discipline institutes such as; *Institute of research methods (research inquiry), Institute of Artistic performance, Institute of Business*, a network of Institutes – places students go to learn with others irrespective of their subjects with a mentor (perhaps) and play and create prototypes to learn in that particular area. As UCL has disciplinary departments, a set of non-formal learning spaces is required which are much more shared and neutral where one could imagine the ways of

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[39] "Opening up Slovenia« website http://ouslovenia.net/

"thinking" it would produce. A place to learn but not necessarily in a conventionally taught way and a place where students can fail. UCL currently lacks a digital equivalent of the Institute of Making, a supported studio environment, where students and staff can experiment with production and skills development outside the formal educational structures.

4. OPEN EDUCATION DIMENSIONS AT UCL

The OER movement has been successful in promoting the idea of fostering many organisations and individuals to create and publish OER. Various new models have already appeared at UCL, from repositories of multimedia content to recent MOOCs and tailored open courses. There are, however, still practical obstacles that have prevented OERs from reaching their full potential. This includes quality control of materials, quality of service as well as the problems of finding, assessing and reconfiguring learning materials. For mainstreaming to happen, building on the OERs available at UCL, common practice and common entry points to ease the use and reuse of OERs need to be created. Many studies like "Beyond OER"[40] are finding that OERs are available but are not frequently used. The same five main barriers have been identified at UCL: (1) lack of current institutional support, (2) lack of technological tools for sharing and adapting resources, (3) lack of skills and time of staff members, (4) and personal issues like lack of trust and time.

In order to map the opportunities for OE at UCL we have adopted a taxonomy with core elements most commonly referenced in the practices around OE. They provide the 'what' of opening up education: opening in terms of access, content, pedagogy, recognition, collaboration and research. These core elements appear as domains of OE in different institutional contexts where OE is being practised and embody the most common practices and perceptions associated with OE at UCL. The transversal dimensions of OE provide the backbone for the realisation of the core dimensions, the 'how' of opening up educational practices. These dimensions are leadership, strategy, quality and technology. Together they enable an environment at UCL for OE practices to be shaped in different ways.

4.1. ACCESS

This includes access to programmes, access to courses and access to educational content (free of charge content or OER). The first major impediment to achieving OE in terms of accessibility is the non-openness of Moodle, which currently provides walls between courses and does not enable resource discovery. The second impediment is the closure of Jisc's Jorum service in September 2016 in response to the changing digital demands of its community. This effectively leaves UCL's OER community without an institutional OER repository, and unable to share and discover new OER. It may therefore be timely for UCL to consider whether we require our own repository as part of the new Education Strategy.

At the moment UCL Digital Education considers there is no real alternative to Moodle as a VLE. It is planned therefore that Moodle will remain in use to manage content in the modules and share resources and communication and assessment. In response to the Connected Curriculum, for example, a supplementary system, the 'Connected Learning Environment' is envisaged to be used for the more organic, collaborative and connected aspects, as well as access to their related communities of practices and networks. MediaCentral is also being launched this summer as a media-focused repository. The future learning environment at UCL is likely to be hybrid of a number of systems.

4.2. CONTENT

This refers to teaching, learning and research materials in digital format which are free of charge and available to all. Content in OE encompasses texts of all sorts, textbooks, course materials, pictures, games, podcasts, video-lectures, software. As mentioned above are currently locked behind Moodle and not discoverable or accessible to staff or students outside named courses.. Apart from MediaCentral, still at an early stage of implementation, there is no mechanism for this apart from social media platforms such as YouTube. Furthermore, open research papers and outputs are presented separately via UCL Discovery which is the flagship in terms of opening up content at UCL.

UCL Press is developing text book publishing as one of their lines of activity. The idea is to look at the download and sales figures for these to gauge how successful the initiative is and then scale it up. These open textbooks allow users to access them freely (they are open and published under a CC BY licence), considerably diminish the costs of textbooks. The question is how a new OE service will integrate with these initiatives.

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[40] Andrade, A., Ehlers U. D., Caine A., Carneiro R., Conole G., Kairamo A. - K., et al. (2011). Beyond OER: Shifting focus to open educational practices.

4.3. PEDAGOGY

Opening up pedagogical practices refers to developing the design for learning so that it widens participation and collaboration between all involved. An interesting example of how learning content can be shared in an open system (i.e. outside the closed VLE) is the work being done at the UCL IOE Library and Archive. The LibGuides[41] has been developed as an open, sharable OER series. The goal to open up the range of pedagogical resources available to students by taking a cross-institutional collaborative approach. An extensive suite of UCL and externally-produced guides aimed primarily at distance learners are seamlessly integrated in on system. Here librarians have the function of curators of content, rather than keepers and the open use of ICTs is reported as having a clear benefit, both by widening the resources available to students and, by making UCL guides available via the same common system, raising our institutional profile. The platform also includes data on student use and an opportunity for users to ask for help and support though the system itself.

There is the potential to share not only OERs but learning designs. Next year a project will investigate a UCL installation of Learning Designer, a platform to share learning designs in a common format. Some argue that learning designs are more useful to share than OER, since the latter are without context. What this means is that one problem surrounding OER is that most resources only make sense in a specific context, and education is not easily reducible to a series of resources; *"you can't just take somebody else's content and use it, you need to be able to adapt it*. It makes sense in this context to share learning designs, where you can show exactly what you did in a particular context, so others could come and adapt that very easily. Learning Designer enables teachers to attach OERs to those in order to make it possible for somebody to reuse, providing the OERs are in a discoverable repository.

It would be of considerable benefit to UCL to share materials but also pedagogies and making pedagogical practices visible, transparent and accessible.

4.4. RECOGNITION

The issue of recognition applies to both learners and academic producers. Recognition enables OE learners to make the transition from non-formal to formal education, to complete a programme in a more flexible way, or to get recruited / promoted at the workplace. When submitting their credentials for recognition, learners expect to gain 'validated credits' which will help them to move ahead professionally and in their personal lives. A practical example dilemma, within the CC, if we say we are able to ask a student to work with UCL on a small digitisation project as part of their research, something that is educational but still the student is spending time on it, so how do we then translate that into grades? It's unclear how much the Higher Education Achievement Report (HEAR) is important or how much employers might be interested to see these activities reported in a Curriculum Vitae, and these should be part of mainstream assessment. An open, innovative and digital learning environment which might generate the creation of OE badges, certificates and credits and pioneer acceptance and recognition mechanisms for third party organisations, including workplace recruitment agencies.

Recognition is also an issue for academic developers. Even if UCL had a well-tuned support and technical system inevitably OERs require additional time investment to check clarity, copyright etc. and to tag and upload. Early OE adopters at UCL express an ethical commitment to open practices but it is recognised that mainstream adoption may require more tangible incentives. Although workload recognition and remuneration are sometimes mentioned, often the motivation envisaged is peer recognition and professional impact. This implies repository systems that both collect and feedback usage statistics but also facilitate communities of practice.

4.5. COLLABORATION

Collaboration in OE has been pioneered at UCL by faculty in early 2000s, when the idea of IPR and open licenses were not really present, but content was freely available on the web, so OER was produced before it was labelled as OER. Collaboration was underpinned by an ethical motivation for openness with the thought that it would make sense to share the expertise with the community via

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[41] Institute of Education LibGuides http://libguides.ioe.ac.uk/

sharing OERs and effectively creating pools of expertise for different research and teaching domains. On the other hand, currently students and learners are not directly empowered to collaborate with each other and with the UCL community in order to produce knowledge, define their unique, personalised learning paths and achieve their own campus goals via formal and non-formal mechanisms.

4.6. RESEARCH

Openness in research at UCL implies a paradigm shift in the modus operandi of research and science which affects the entire scientific process. Dr Paul Ayris, Director of UCL Library Services is working with the Vice-Provost (Research) to establish a UCL Open Science Platform where all UCL's work on the Open agenda can be reported, connected and new initiatives identified. The Vice-Provost will assume the position of Chair, and Dr Ayris will be the Executive Officer. It will meet a minimum of three times a year from September 2016. Obviously, Open Educational Resources will be on the agenda.

4.7. STRATEGY

There seems to be a strong drive not just to create and frame a strategy for OE that would fit UCL's identity and modernisation pace, but also a combined or overarching OE digital strategy. This should supply UCL with the creation of a unique and valuable position on OE involving different sets of activities.

4.8. TECHNOLOGY

Technology is often cited as the main ICT enabler and missing part in the OE mosaic at UCL. In between the internal and external usage of Moodle and the UCL Press e-prints repository, a non-existing OER repository and discontinued Jorum, MediaCentral and plans for the Connected Learning Environment, there is a space for a new and innovative approach unifying multiformat outputs of UCL for educational purposes.

A common platform, supported by appropriate processes and policies is often evisaged as a possible approach to tackle these fundamental OER use problems (see Figure 3) from a different perspective. The principle is to take a 'bottom up' approach, to start the OER repository. Once this is established the potential emerges to create commonalities from the variety of data. From this is becomes more feasible to create a comprehensive analytics and modelling framework with simple scripts and snippets that can be easily integrated into OER, OA, or Open Data sites to gain access to all of the richness of the digital OE landscape. See Fig 3 for a sketch of this development model.
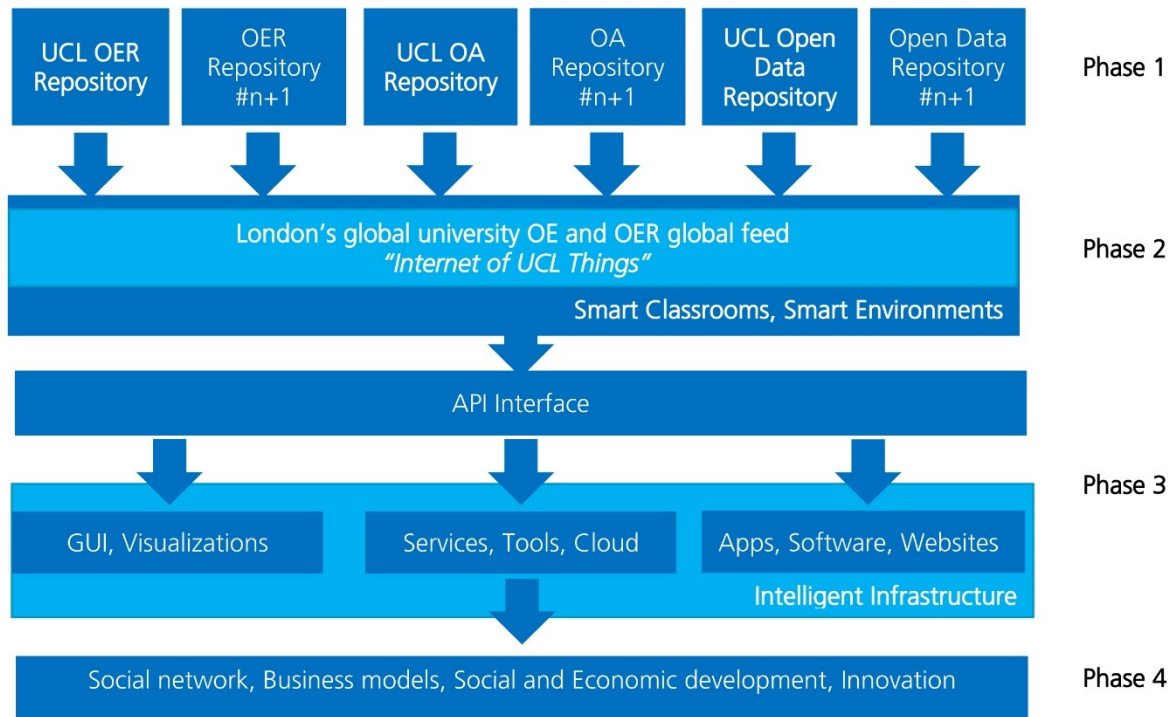
Figure 3: *Process of creating, extending UCL Global OER feed and include other repositories*

4.9. QUALITY

The current OER materials are of exceptionally high standards, but if OE is to go mainstream and especially public appropriate 'light touch' QA mechanisms need to be considered, to enable rather than hamper production by staff and students. At UCL there is considerable evidence in the OE portfolio to see an initial convergence of the 5 concepts of quality (efficacy, impact, availability, accuracy and excellence) with UCL's OE offer and opportunities.

4.10. LEADERSHIP

UCL has so far not developed the formal leadership in OE, to identify and promote actions that enable OE take up across the university by a whole range of stakeholders, including students. It is suggested that to make a step-change into more mainstream activity, formal mechanisms will be necessary. Most activity so far has been localised and centred on the current UCL champions presented in this brief report. Leadership should support the creation of OE policies and practices at different levels: personal motivation, task organisation, intra-, inter- and cross-departmental collaboration, and outcomes connecting management, business and strategy.

4.11. STAKEHOLDERS AND INITIAL VALUE PROPOSITION

During the study, a need emerged to identify all the internal and external stakeholders that would benefit from an OE structure at UCL and how to therefore make an attractive value proposition to our "potential clients" as demonstrated within Fig 4.

An OE structure including OER, open data, open access materials and more would present a value model and possible future revenue model and provide visibility of the research community to the industry and academia to the educational marketplace that might be interested in reaching such upscale researchers, academics and professionals and use, reuse, remix their resources.

Once a feasible and clear value proposition, explaining how OE solves some of the problems faculty and researchers are facing, is developed and how it improves their situation (relevancy) and delivers specific benefits (quantified value), then we will also be able to create, plan and adopt business, value, incentive and reward models.
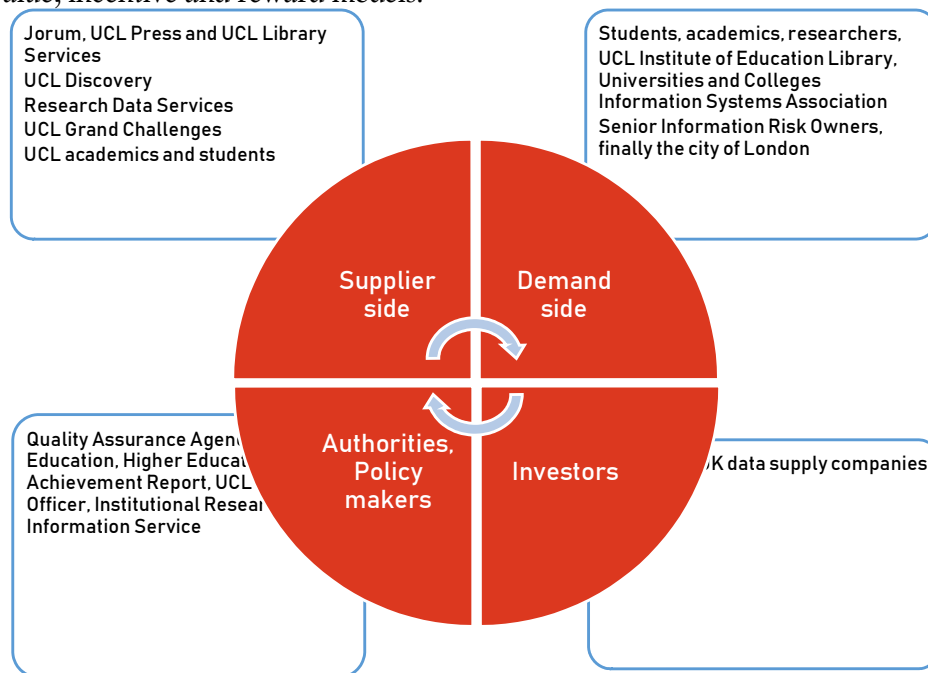

Figure 4: *UCL stakeholders in "Internet of UCL Things" platform and open education*

One of the needs practitioners identified was for a clearer idea of the added value of OE for individuals and the institution. Stakeholders can be identified as;___

- **Supplier side:**

This consists of all involved parties from the supplier side such as Research, Data services, UCL Information Services Division, Integration and Software Developers, etc. Those parties will be able to create the digital and non-digital OE service, but most of all scale and sustain the digital platforms architecture and provide feedback for improvements. The main value for those stakeholders is:

- Viable users interested in the pool of available OER, OA, open data
- Manage and provide high quality services and add-ons for the platform
- Provide easy integration into MOOCs, LMS, and CMS systems and addition of repositories.

- **Demand side:**

Includes all possible OER, OA and open data consumers and those related to MOOCs as a side market (Big Data, Analytics and Broadband, etc.). In the context of UCL those are:

- Internal UCL staff and students, UCL data groups
- External MOOC and eXtend participants
- University and educational Executives and IT leaders
- LMS and eLearning providers
- Telecom and ICT solution providers (bandwidth, devices and Big Data)
- Corporate training service providers
- Enterprise L&D executives and managers.

In principle, those parties will benefit from OER provision since they will be able to have:

- High quality OER, OA, open data
- Expand their profiles and impact

- Improve their social networking and academic profile and ranking
- Better understanding of their user profiles.

- **Authorities/ policy makers/ investors:**

Includes external stakeholders and partner, also the city of London and UK authorities, private bodies. The UK government in particular is involved in strategic planning governmental digital services[42], and services in OE with a long term vision of using technology and Open Educational Resources as opportunities to reshape UK and European education and build on its recent initiatives Rethinking Education[43], European Higher Education in the World[44] as well as the flagship initiative Digital Agenda[45] and communication Opening up Education: Innovative teaching and learning for all through new Technologies and Open Educational Resources.

- **ICT industry and/or EdTech industry:**

ICT providers, partners and integrators of educational technologies for universities

4.12. INITIAL SWOT ANALYSIS

The following section of the report discusses the preliminary SWOT Analysis of the introduction of OE and OER to UCL and its sustainable and scalable structure. This needs to be taken into consideration together with the UCL Open Science strategy that will be established in September 2016. The analysis should assist UCL to:

1. Identify and pursue opportunities that may possibly be a good fit to its strengths,
2. Overcome its current and future weaknesses to pursue opportunities,
3. Identify ways to use its strengths to reduce its vulnerability to external threats that may appear
4. Establish a defensive plan to prevent UCL's weaknesses from making it highly vulnerable to external threats.

This first SWOT analysis is intended to provide a balanced perspective on the limits and possibilities of an institutional strategy on OER, and to present the challenges going forward.

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[42] GDS – Governmental Digital Services https://www.gov.uk/government/organisations/government-digital-service

[43] EC Communication – Rethinking Education http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1389776578033&uri=CELEX:52012DC0669

[44] EC Communication - European Higher Education in the World http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52013DC0499

[45] Digital Agenda for Europe http://eur-lex.europa.eu/legal-content/SL/TXT/?uri=uriserv:si0016

	Helpful To achieving the objective	Harmful To achieving the objective
Internal origin	**Strengths** • UCL has a stated mandate in supporting public engagement, towards utilisation and production of OER. • UCL is committed in its Education Strategy to an OER service, showing institutional commitment to OER and OE • **Strong bottom-up support in OER creation with (currently) stronger desire to create OER rather than reuse, revise, remix, and redistribute.** • Quality controlled OER at UCL can showcase high quality available material and possibly attract potential fee-paying students. • Some existing (but fragmented) technical capabilities and infrastructure for the harnessing and delivery of OER. • Large amount of existing UCL content in Moodle and on faculty websites that has the potential to be released as OER with some modification. • UCL has high quality teaching materials to contribute to a growing global base of available OER.	**Weaknesses** • No national HE policy support for OER initiative. • Low quantity of published OER at UCL. • No current OER institutional repository. • No model or data on usage or adoption of already existing OER. • No detailed information on OER awareness with faculty and students. • Academic and research staff lack the skills to create OER, and reuse, revise, remix, and redistribute OER and to change their approach to teaching and course development. • Possibilities of further OER support and assessment may increase workload. • Lack of incentives to encourage the use and production of OER. • High possibility that users infringe copyright (Third party materials might still be used which would have rights issues)

External origin	Opportunities	Threats
	• Improvement of teaching materials by (i) making use of high quality existing external materials (ii) making UCL-produced materials openly available creating increased opportunity for feedback and TEF ranking (iii) more transparent exchange of teaching practice	• Opening up materials from Moodle as OER might prove time consuming (quality and copyright checks)
	• The consistent licensing of OER improves sustainability of created resources	• An open digital environment will make it relatively simple for users to copy and use UCL's resources. This suggests a need to follow UCL Press and adopt a structured open licensing approach.
	• OER to support initiatives like Grand Challenges.	• Negative impact on UCL branding and image if OER are of poor quality.
	• OER are digital files, so discovery and advanced analytics creation via one-stop-shop consumption.	• Change not leading to improvement of student retention, support and quality of services.
	• OER is an opportunity to showcase high quality teaching resources at UCL, creating a positive impact on institutional, local, regional and global reputation.	• Rapid evolution and development of technologies make long-term planning difficult.
	• The integration of OER into courses can supplement or replace materials produced by UCL. This may accelerate materials development time frames and reduce course development costs.	• Negative feedback from staff, academics, researchers and students on new demands.
	• New business models, not directly via OER, but through the Connected Learning Environment.	• Peer-pressure on UCL for not making decisions regarding the open movement.
	• Building towards a holistic teaching material technical infrastructure.	• Poor awareness raising, advocacy and management within UCL resulting in failure to change processes, offerings and courses in line with the strategic decisions.
	• Emerging concept around digital ubiquity of educational data.	
	• Competitive strengths combined with strategic decisions on OE practices.	

Table 1: *SWOT analysis prediction of OER at UCL*

The purpose of this second SWOT analysis is to go further to describe the value proposition of opening up education in UCL. All these issues have been already described throughout the document, and we now provide answers to the identified weaknesses, threats as well as demonstrating strengths and opportunities. Table 2 shows the first SWOT analysis on opening up education at UCL:

	Helpful To achieving the objective	Harmful To achieving the objective
Internal origin	**Strengths** • UCL has a strong ethos of "open" across the campus, OE is already natural to minority groups of academics, researchers, staff and students. • **Growing awareness by researchers for the need to provide open resources and data.** • UCL Press provides a useful model of holistic and strategic adoption. • By adopting OE and given its research-based teaching strategy, UCL will position itself as an exemplar in new educational approaches. • OE can become part of the Connected Curriculum's initiative to close the divide between teaching and research. • Due to its formal/informal combination OE can be a vehicle for social and economic change on campus.	**Weaknesses** • UCL might be reluctant to experiment on a large scale across schools, departments, all academics, researchers and students. • No current existing pervasive mechanisms for introducing OE into the digital and real-life activities of UCL. • Most higher education institutions involved with OE are either experimenting or doing it on an ad hoc basis.There are few other institutional strategies, so inhibiting the potential for collaboration with other higher education institutions (HEIs) and the development of the field as a whole. • No direct connection as yet to core business models, branding and institutional research and education initiatives. • Lack of shared vision of how OE could help UCL improve its educational provision and the learner experience.

External origin	Opportunities	Threats
	• Positioning UCL as lead university that has adopted a holistic approach to OE to harness the potential from ethical to technical means. • OE could support Grand Challenges to encourage new and intense collaborations across UCL's disciplines, departments, schools and staff; via OA and OER widen academics' understanding of the relevance of their research; and via Open Educational Practice stimulate policymakers, practitioners and community groups. • OE encourages the creation and use of innovative IT services for all UCL students and staff to enable more flexibility in educational processes and learning delivery. • Aligns with public agenda of closing the gap between knowledge and learning among people at all levels of society. This is a good time to expand opportunities for learning, in formal, non-formal and informal settings. • OE supports initiatives like citizen science, long term development of partnerships between UCL and schools, local communities and local industry should contribute to a more academically-engaged and literate society and students with a better awareness and skills to apply in their careers.	• Few UCL staff have a clear understanding of OE and its potential, especially looking at it in a holistic way. Senior management on the contrary does. • Unforeseen expenses and employment of additional staff in UCL in order to cater for the new needs for students and staff. • Failure to link OE into the UCL Education strategy and introducing only a partial OE service including only OER. • Designing an OE strategy for UCL, or better, re-design the current strategy to embrace OE in many dimensions; becoming a more open institution could be seen as too invasive and lack a business focus. • UCL regarding OE as a high risk.

Table 2: *SWOT analysis prediction of opening up education at UCL*

5. RECOMMENDATIONS TO PROVIDE SUPPORT FOR OPEN EDUCATION AT UCL

- **Pilot departmental and/or thematic case study to understand the potential and limitations of OE implementation in a UCL context**

Future development of OE at UCL needs to be informed by a clear and critical idea of the practical implications of an increased commitment to OE in terms of workflows, practices and technologies. The motivational aspects of OE need to be explored to understand possible feedback, impact and recognition incentives. This can only be unpacked by undertaking and evaluating longitudinal pilot studies with relevant groups of academics. This would involve impact analysis, development of the value proposition and investigation of incentives.

- **Specify, investigate and evaluate UCL-specific technical approaches**

An integrated digital infrastructure is often seen as a critical element to support a move towards OE practice. The potential for this is described in the report, but this can only be achieved within UCL's technical and financial infrastructure. A number of systems are well established (e.g. Discovery, Moodle, MediaCentral) but the potential for 'opening' and integrating. User and support requirements, gap analysis and a solutions review would underpin this work.

- **Develop an integrated strategy for UCL Opening Education**

Develop an overarching and holistic opening up strategy, which is fully integrated with the mission and vision of the university, and explicitly aligned to existing research, education and digital support structures and provision. . Without an institutional strategy, open educational practices will remain granular and at an experimental level, so restricting impact and return on investment. The holistic approach advocated here could lead to a whole new stream of pedagogical activity which will need further investigation and evaluation. It is appreciated a combination of several elements of openness will be required to achieve this objective. This will require expertise drawn from different perspectives (e.g. libraries, research, academic development, digital education) across the whole of UCL. The current OE special interest group should be developed and tasked to outline and develop this strategy.

- **Establish a collaborative community of practice in UCL Open Education**

Collaboration and sharing are intrinsic to the concept of OE, and it can only have impact if an active institutional community of practice can be established. At UCL cross-institutional collaboration is already a component of the Connected Curriculum and is a step further towards the beginning of scaling up openness: students and faculty creating OER, open practices in modules and credits being recognised; courses and content being co-produced by students and faculty and so on. Cross-institutional initiatives should be encouraged. Furthermore the institution-wide OE potential of related initiatives such as the UCL Grand Challenges should be explored.

- **Create a portfolio of open educational polices**

UCL should create a set of integrated policy recommendations, an agenda that should involve various stakeholders simultaneously: educationalists, technologists, teachers, researchers, learners, employers, business owners and funders, possibly even government. In this way, a supportive approach to open up educational practices and opportunities can be put in place.

- **Specify and pilot an open education resources (OER) service to provide a showcase for UCL education and for student-generated content**

The above work packages will map the landscape and outline policies, processes and support mechanisms. This will inform the service proposed in the Education Strategy, and this should will require to be piloted, evaluated and rolled out by 2021.

6. CONCLUSION

General conclusion

The above analysis shows that open education and especially OER and open data as an academic practice already exist at UCL and that there is an opportunity to build on these initiatives to develop a comprehensive and valuable OE profile for the university.

The analysis has brought to the surface some of the challenges that UCL could face in a transition from small-scale OE practices, to official supported adoption and practice. Given the generally positive attitudes to OE, at least among the 'early adopters' in this study, we conclude that these can be overcome but more specific project work is needed to UCL-specific approaches. Integrating and enhancing the technical infrastructure is probably a key enabler. Current systems are fragmented and partial but may have the potential to be opened and enhanced to meet future requirements, but again some investigative work is needed.

The recommendations highlight the need for further project work to unpack the practicalities and potential processes, including impact and incentives. The need for strategic and policy development is also identified as is the involvement of the academic community. The final aim of this process is the initiation and evaluation of the service as proposed in the Educational Strategy.

We conclude that the sustainability of the OE initiative requires a transition from OER being a social behaviour at UCL to OER becoming institutionalised as academic practice. It is the belief of this author that a sustainable inter-institutional collaborative framework following the recommendations listed for the introduction of OE has potential to help achieve this goal.

Study limitations

The current study was limited to a section of participants on a voluntary basis, OE champions and advocates within UCL, these were more proactive staff, so responses may well be more positively biased. In future research we propose an alternative strategy with a randomised selection of participants and employing alternative market research strategies for improving the response rate. The interviews yielded a broader selection of views than the open questions could ascertain. The survey sample was not yet sent and we do not expect many respondents, and larger scale studies are required in multiple schools, departments and centres to provide a rich body of data from which to draw conclusions.

7. APPENDIX 1 - THE RESEARCH PLAN

Description	Question
The goal of this study is to highlight the possibilities offered by the adoption of Open Education approaches within University College London. The overall aims were stated as:	1. Review the availability and feasibility of OE at UCL 2. Make suggestions for possible action to be taken.
With regard to the general objectives outlined above, the following **general questions** were stated as:	1. What is a) the availability and b) feasibility of OE at UCL? 2. What possible actions may be taken in order to enhance the use of OE at UCL?
In addition, **fifteen specific questions** were provided and produced over the course of the interviews:	1. What's in it for UCL? How can UCL benefit from OER and OE, especially in today's political reality and competitive space in HE? Why is OE important and what is it exactly? 2. Open for whom and by whom, who is giving and who is receiving? 3. Should UCL experiment on OE or take the usual path towards copying others? 4. What are the main pillars of opening up education at UCL? What would be the service? 5. What benefits can an OE strategy bring to UCL, to students (on and off campus), to London, as UCL is London's global university, the region, the UK or to Europe as a whole? 6. If one were to design an OE strategy for UCL, or better, re-design the current university strategy to embrace OE and become a more open institution, what should they take into account? 7. What quality aspects may be considered in the use of OE at UCL? What quality assurance issues may be considered? How can OER improve the quality and efficiency of training and education at UCL? 8. Are the Creative Commons licenses the best answer to licensing of open content? 9. How can OER and/or OE contribute to raising recruitment rates at UCL? 10. What are the implications for education services and decision-makers of the use of OE at UCL? In particular what issues of accreditation/validation of skills and competences acquired via OE at UCL could be considered? 11. How can existing policy statements to support OE at UCL best be used for the inclusion of OER? 12. What combined impact would OE have on UCL's work on Citizen Science, Global Challenges and Connected Curriculum? How can this affect London as a city? 13. Advocacy to academics (and students)? 14. What metrics do we need to measure success in OE? 15. What about reward and recognition structures (e.g. pay rises, promotion) for adopting OE practices?
The methodology involved:	• Contextual inquiry, user testing and interviews with stakeholders involved in the OE arena on campus • Consideration of studies and material on the topic provided by the European Commission, Joint Information Systems Committee (JISC), etc.

Table 3: Research Plan

8. APPENDIX 2 - LIST OF INTERVIEWEES

Name	Surname	Title	OE work
Paul	Ayris	Director of UCL Library Services & UCL Copyright Officer, Chief Executive, UCL Press	Open Access
Fiona	Strawbridge	Head of Digital Education, UCL Information Services Division	
Dilly	Fung	Professor of Higher Education Development, Academic Director, UCL CALT	Connected curriculum
Clive	Young	Digital Education Advisory Team Leader, UCL Information Services Division	
Javiera	Atenas	Learning Technologist, UCL School of Management	Open Data use
Nazlin	Bhimani	Research Support & Special Collections Librarian, Newsam Library and Archives, UCL Institute of Education	OER development
Ulrich	Tiedau	Senior lecturer in modern Low Countries history and society, UCL School of European Languages, Culture and Society	OER development
Simon	Mahony	Senior Teaching Fellow in Digital Humanities, Department of Information Studies	OER development
Matt	Jenner	Distance Education Advisor, Educational Design and Engagement Team	Open Courses development
June	Hedges	Leader of the KPA on the User Experience, Senior Management Team in the Library	Open Access
Stuart	Nicol	Online and Open Education Team Manager, Educational Design and Engagement Team	Open Education at UEDIN
Tim	Neumann	Learning Technology Fellow, Institute of Education	OER development
Samantha	Ahern	Senior Information Security Officer, Information Security	Use of Open Data
Vincent	Tong	Principal Teaching Fellow (Connected Curriculum), UCL Centre for Advancing Learning and Teaching	Connected curriculum
Jason	Norton	E-Learning Services Manager	Open Learning environment
John	Shawe-Taylor	Head of Computer Science Department, Dept. of Computer Science	Open Software
Carla	Aerts	Director of Futures, Institute of Education	Open Future
Eileen	Kennedy	UCL Knowledge Lab, Institute of Education	MOOCs development
Steve	Rowett	Team Leader, Digital Education Developments	Innovative practices
Thomas	Kador	Teaching Fellow, Public and Cultural Engagement	Connected curriculum
James	Paskins	Coordinator for UCL Grand Challenge of Sustainable Cities and the UCL London Agenda	Grand Challenges

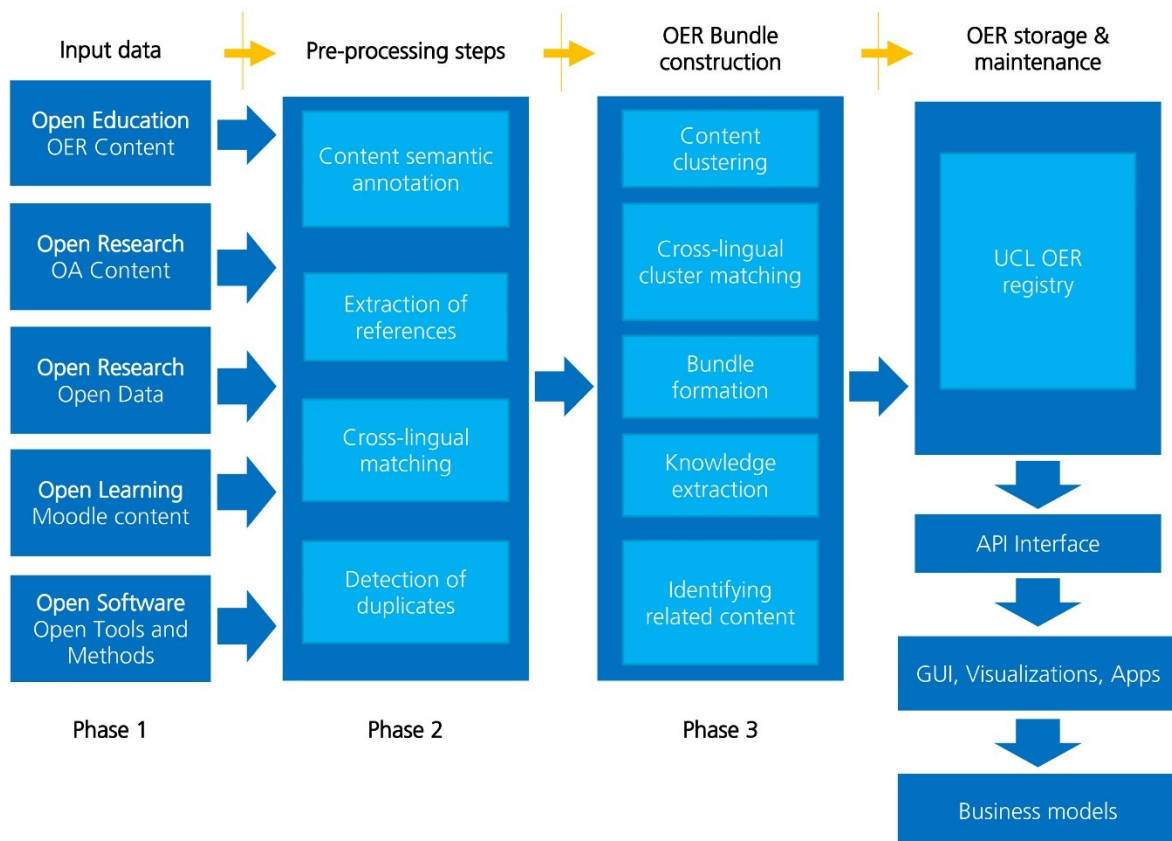*Table 4:* List of Interviewees

9. APPENDIX 3 - QUESTIONAIRE

Question	Answer
1. Are you aware of the term "open "education"?	- Yes - No

2. Would you like to try open educational activities at UCL?	• Yes • No
3. Are you aware of Open Educational Resources (OER)?	• Yes • No
4. Do you make your materials available to others to share?	• Yes • No
5. To whom do you make your resources available?	• Academic colleagues who you work closely with • Academic colleagues within the faculty • Other academic colleagues, for example, through a subject network • Academic colleagues outside the faculty but in UCL • Openly available to anyone who wants them globally
6. Do you use resources that have originated elsewhere?	• Yes • No
7. Where do you obtain resources?	• Academic colleagues who you work closely with • Resources taken from the Internet • Resources supplied through a textbook manufacturer • Other academic colleagues, for example, through a subject network • Academic colleagues within the faculty • Academic colleagues outside the faculty but in UCL
8. Indicate how you feel about SHARING your educational resources?	• I believe in openness and have no problem with sharing • OER enhances the reputation of my institution • I'd be happy to share in a reward/incentive system • Sharing resources enhances my reputation as a good teacher • I'd be happy for someone to adapt my resources • I would need to be acknowledged as the author • I have no support for making materials openly available • I have concerns over copyright • Why give away resources to other universities • I don't wish to give colleagues the advantage of using my resources • I don't wish to share resources that I've spent a long time preparing
9. How do you feel about BORROWING educational resources?	Borrowing resources saves time and money I only use resources from someone I know and trust I have trouble finding resources of high enough quality

	I'd only use resources recommended by someone I know and trust It is not easy to adapt resources to meet my needs I don't really know where to look for them I prefer to work individually and use my own resources
10. What infrastructure, help and rewards would you like to see?	Incentives for people who develop the resources A one-stop-shop where I can create, reuse, revise, remix, and redistribute OER An institutional repository (resources open to UCL staff & students) Staff development Clarity over copyright IT/technical assistance
If you know of any OER, open data, open education, open pedagogies etc. projects at UCL, please drop us a link or a line	

Table 5: *Draft OER awareness survey at UCL[46]*

10. APPENDIX 4 – ADVANCED TECHNOLOGICAL INFRASTRUCTURE

[46] ROLFE, Vivien. Open educational resources: staff attitudes and awareness. Research in Learning Technology, [S.l.], v. 20, feb. 2012. ISSN 2156-7077. Available at: <http://www.researchinlearningtechnology.net/index.php/rlt/article/view/14395>. Date accessed: 04 Aug. 2016. doi:http://dx.doi.org/10.3402/rlt.v20i0.14395.

Figure 5: *Process of creating UCL Global OER feed including OA, Open data materials*

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