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Refining Open Educational Resources For Both Learner And Institution

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Refining open educational resources for both learner and institution

Submitted for the degree of Doctor of Philosophy by Published Work

Learning and Teaching Innovation

The Open University

October 2018

Part 1: Covering Paper

Part 1 Covering paper

The title for the proposed thesis is '*Refining open educational resources for both learner and institution*'. It examines the impact of open educational resources (OER) created by The Open University (OU) and recent developments to recognise, motivate and reward learners through the issuing of free open digital badges.

This PhD by Published Work submission will follow a standard format:

- PART 1 – COVERING PAPER
- PART 2 – THE PUBLICATIONS

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My adventures into Open Educational Resources (OER) research began in the Institute of Educational Technology (IET) in 2008 when I was welcomed by Professor Patrick McAndrew and Professor Martin Weller, established and respected figures in the OER movement, to contribute to their projects. Their encouragement to ask my own questions of the movement gave me the confidence to continue to research OER after leaving the Institute four years later. Alongside Patrick and Martin, I am especially grateful to Dr Leigh-Anne Perryman who, in ignoring the barriers apparent to many staff in non-academic positions, co-researched and co-authored with me as a peer during the early stages of my research into OER.

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Abstract

The Open Educational Resources (OER) movement over the past ten years has described many benefits of releasing learning for free, including business remunerations to institutions as well as a means to altruistically reach underserved groups. By examining learner behaviour and motivation, the papers collated for this PhD by Published Work bring a critical analysis to the experience of delivering OER addressing the broad research question “How can the refinement of OER benefit both learner and institution?”.

A range of qualitative and quantitative research methodologies and associated website analytics are used to investigate the challenges of repurposing OER together with how the motivations of those wishing to take advantage of OER usage can be better supported. During the five-year time line of these papers, formal students and informal learners, predominantly UK-based, were surveyed by the author generating several thousand responses.

These surveys focussed mainly on a large institutional endeavour to deliver OER at The Open University, key findings from which show the business impact of open educational practice where literature had provided only theoretical assumptions. The data also exposes the many and varied motivations of learners using OER where literature has focused largely on the experience and attitudes of educators.

The thesis reveals learners’ problems with OER usability more generally, and critically, the desire for certification of OER study against the prohibitive costs of studying in higher education. It describes the development by the author and associated impact of the application of digital badges (or ‘micro-credentials’) to reward users of OER as recognition for informal learning achievements.

The thesis includes recommendations that extend beyond one institution’s OER policy, regarding the design and curation of OER globally to better serve the needs of learners, particularly those who cannot afford formal study. It also highlights the need to bring together OER and micro-credentials

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more cohesively to explore the potential of a framework of core work-related skills needed for a digital economy.

It is concluded that there is an economy of scale to the delivery of OER, but that the key to successful impact is through robust open educational practice, instructional design and tangible recognition to learners of their achievements.

Chapter 1 Introduction

This submission for the degree of PhD by Published Work draws together findings from work conducted from 2011 to 2017. The eleven publications reflect a journey of research, refinement, experimentation and re-evaluation in the context of my role as the Head of Free Learning for the Open University (OU), responsible for the commissioning of free learning materials on the University's public learning platforms.

My thesis is framed in terms of the following three themes:

1. The challenges of repurposing formal learning content as Open Education Resources (OER).
2. Supporting the motivations of informal learners using OER.
3. The refinement of OER in support of the social and business mission of delivering free learning.

While I have attempted to address each of these research themes in turn in Chapter 3, my work has been undertaken in the context of using the OU's systems and platforms available to me. However, the implications of my work are wide-ranging, particularly around digital badging for OER and to inform how changes in open educational practice can positively impact educational institutions' formal and informal learners.

In order to research the impact of benefits to the learner and institution and the factors that influence that impact, the engagement of learners was measured through qualitative and quantitative data collection methods and the review of website analytics. The majority of the studies undertaken for this research were focused on the OpenLearn platform, the OU's free learning website that has delivered excerpts of the University's taught modules as Open Educational Resources (OER) since 2006. Due to direct access to the platform and its users, routes to feedback were clear and easily accessible and presented an opportunity for rapid data collection given the extremely large body of people using the platform (over six million a year). Refinement of OER was approached with scale in mind and a view to influencing open educational practice within the OU and Higher Education Institutions working with OER.

I make extensive use of my knowledge in learning design for open, untutored study and have broad and embedded interests in the application of free learning in support of outreach and business impact. My thesis reflects this since it comprises an analysis of project-based and institutional attempts to adapt formal learning for use as OER and in the commissioning and evaluation of new OER for target groups and purposes. The majority of the thesis is based on work I have led myself: both the refinement of OER and the evaluation of its impact. This process is ongoing and has led to fundamental changes in the practice of learning design for OER at the OU and the application of digital badges to reward and motivate learners. It demonstrates that this ongoing evaluation and refinement not only benefits learners but greatly improves business impact and directly influences the strategy for free learning provision.

Structure of Part 1

A PhD by Published Work should provide the following in Part 1: Covering paper:

- a) a summary of each publication;
- b) the interrelationship between the publications;
- c) a critical review of the current state of knowledge and research in the field, and indicate how the candidate's work has contributed to the field; and
- d) commentary on the reception of the publications, as indicated by citations and reviews, and the standing of the journals in which they were published.

This chapter provides a biographical and contextual summary of my professional role and its relationship with research, and research methods used. Chapter 2 gives a summary of definitions of informal and non-formal learning, followed by a literature review of current work around the function of OER and theoretical business benefits to institutions delivering them, and the growing application of digital badges in education (requirement c)). Chapter 3 explores my contribution to the field, addressing each of my key research themes and the interrelationship between the publications (requirements b) and c)). Chapter 4 summarises for each of the 11 publications in chronological order,

the context in which they were written and their reception since publication (requirements a) and d)). Chapter 5 provides a summary of conclusions from the thesis overall, the developing future direction of OER and digital badging at The Open University and more widely in higher education (HE). The publications themselves are published in Part 2.

Biographical and contextual review of this study

This section considers the context for the work described in this submission, focusing on my role when the work took place (the second decade of the 21st century), the institutional setting (The Open University, UK), its relationship with OER, learning platforms and channels that were evaluated, and the growing interest in digital badges. It does not provide a full history of the OER movement, but instead, focusses on the application and development of OER to increase reach (altruism) and for business purposes, coupled with opportunities to experiment with digital badging as a means to reward and motivate informal learners. This was (and remains) a critical activity in proving the worth and impact of OER as an institutional and global educational endeavour.

My role at The Open University and its relationship with OER

My role in the OU has always included an element of research. It is wide-ranging inasmuch as it straddles both professional and academic work, the practice of which became apparent when I joined the Institute of Educational Technology (IET) in 2004. Whilst I was ostensibly employed on an academic-related contract, the work of my team was in support of research projects and the evaluation of the OU's formal taught modules. The concept of this dual role led me to be involved in my first research project in 2009 to look in more detail at the blurred boundaries of academic and professional life (Whitchurch & Law, 2010). Whitchurch had described an emerging "third space" for HE professionals who are capable of performing 'blended' roles, comprising elements of both academic and professional activity (Whitchurch, 2009). At that time, this "third space" activity wasn't always recognised in my work nor those of my team. Today however, much has changed in this regard

and it is recognised that my role today as an HE professional requires me to evaluate for both business and academic (public) purposes as there is perceived worth in this dual activity and skill set.

My skills as a researcher have grown given the numerous studies, datasets and varied projects I have commissioned, evaluated and been tasked to research, as part of my developing professional role in HE and within that, OER. I have learnt much about handling open course development and analysis and have refined my approach to questionnaire design to complement associated data analytics, over time. My approaches and methods are discussed more fully later in this chapter.

The specific activities I undertook during the time that the publications were written for this thesis are described in Chapter 3 but began with the Open Learning Network (OLnet) (OLnet, 2016) and Bridge to Success (Bridge to Success, 2012) projects which provided the first opportunity to work with the OER research community as a whole. The successes and challenges of repurposing formal learning content as OER (for the Bridge to Success project) and the potential impact of that activity weren't the only large OER projects being undertaken in the University at the time. Other projects in separate units and faculties were researching and developing OER for different audiences, for example, the International Development Office delivering free educational content for teachers in Africa (TESSA, 2017)) and the Open Media Unit in producing OER for publication on the OpenLearn platform, iTunes U and YouTube.

As a result of observing this apparent disconnect between the various large-scale OER activities in the University at this time, I set up the OER Advisory Group in 2012, which comprised project leads, principle academics and Directors, to discuss and share ideas and outputs and to deliver the University's Open Educational Media Operating Policy (The Open University, 2016b). This policy provided a means to define what open educational media is to the University, its main purpose and guiding principles regarding delivery and development. It provided a means to clarify the relationship between the Open University's Charter and the operating guidelines to deliver free learning via OpenLearn and third party channels such as YouTube and iTunes U.

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Through its mission to provide OER at scale, OpenLearn was launched in 2006, and while not a unique presence on the global stage in providing free adult learning content, it was the only site of its kind based in the UK. Other OER sites, such as the Saylor Foundation platform and free course materials issued through OpenCourseWare (Massachusetts Institute of Technology's (MIT) free course extract website) were established in the early to mid-2000s as non-profit-making entities with a mission to provide free learning under a Creative Commons licence. (The Creative Commons licence itself, was founded in 2001.) Like MIT's OpenCourseWare, OpenLearn helped to lift the lid on formal university teaching material, giving learners a taster of study and access to content they might not otherwise have been able to afford to use.

The William and Flora Hewlett Foundation began investing in OER projects in 2002. They define OER to be "teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge" (William and Flora Hewlett Foundation, 2017).

When OpenLearn was launched as the result of a two-year William and Flora Hewlett Foundation-funded project, the OU attempted to release 5% of its taught courses into the public domain as OER. The University continued to undertake this activity after funding ended in 2008 as it complemented the OU's Royal Charter which states that it should "promote the educational well-being of the community generally" (The Open University, 1969, p.iv) and was already doing this through its broadcast relationship with the British Broadcasting Corporation (BBC). OpenLearn was merged with the Open2.net website in 2010, a platform where learners could find out more about BBC-OU programmes and connect with subject information and topical articles. OpenLearn is now globally recognised as one of the leading OER platforms for range of content and usability (MOOCLab, 2016). It sits amongst an increasing range of for-profit and not-for-profit Massive Open Online Course

(MOOC) and nano-degree providers and is ranked in the first page of search results for the term “free course” despite an extensive range of free learning available online today.

After I had started my research journey into OER, I observed this institutional endeavour to produce OER at scale as one which had become almost completely uncoupled from OER research – a separation of practice and research – and presented an opportunity to me to reconnect these worlds. Many of the large OER-funded projects at the time were focused on examining the efficacy of OER projects in the US or indeed, instigating them. As a co-author of the successful bid to the Hewlett Foundation to fund the OER Research Hub in 2012, I became more immersed in research methods and outputs around OER and was successfully appointed as a research fellow for the project, which I undertook in addition to my day-to-day work. I took this opportunity to identify the gap in research for UK-based institutional OER delivery, investigating and uncovering major issues to support OER in the UK, particularly through the provision of recognition and reward for OER by the application of digital badges.

This activity set me in good stead to move to the position of Head of Commissioning for OpenLearn and the University’s channels on iTunes U and YouTube in 2013. It was here that I was able to extend my research into the refinement of OER and to understanding the motivations of informal learners, and relate this activity to direct practice in the commissioning of new OER.

This refinement took the form of researching learners’ motivations for, and expectations of, their learning experience and responding to this by modifying my commissioning approach and development and design of online learning. From a technological perspective it also involved me working with IT developers and usability designers to improve the online learning experience and to enable progress tracking, issuing of certificates and digital badges through automated means.

The announcement that The Open University would own and develop FutureLearn came late in 2012, followed by a series of announcements about how it would “strengthen the UK HE Sector by:

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- Maintaining the world-leading brand of UK HE, which currently has 18 of the top 100 universities
- Building an international growth opportunity within the UK HE sector, where direct exports in 2008/09 were £7.9bn
- Building innovation in UK HE by developing world-leading online teaching and learning practices.”

(The Open University, 2013).

I was swiftly required to incorporate the commissioning and production of the University’s MOOCs for FutureLearn in to my work. This required a research strategy that went beyond web analytics, so the surveys that I had co-devised for the OER Research Hub and for OpenLearn, were used as a basis for the qualitative evaluation of all FutureLearn courses and remain so to this day. During this period I was also piloting the use of digital badges in OER and examining their impact, along with the responsibility of reporting the impact of the first ten Open University MOOCs on FutureLearn.

With an uncertain future, I focussed my commissioning recommendations and research lens on OpenLearn where the opportunities for greatest impact, both from an outreach perspective and in the generation of new student enquiries, appeared greatest. As the University invested millions of pounds into the FutureLearn business and associated production costs (Kernohan, 2015), the impact on the team creating free courses for OpenLearn that I had inherited, was significant inasmuch as I was required to lead on their development for a period of around two years.

However, by 2015 the Open University’s FutureLearn MOOC production activity had been reassigned to a small team whose remit was to develop “revenue MOOCs” of a particular shape and size using established production processes. I was then able to reinvigorate open educational practice and the design of OpenLearn courses that were being developed as a by-product of formal course production. Research into the development and impact of Badged Open Courses (BOCs), MOOCs and OpenLearn content during 2013-15 provided robust data and recommendations with which to create a project

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that would see the complete refinement of free courses and modifications to open educational practice at the University.

The Open University's interest in digital badging

The rise in the use of digital badges in education globally, is discussed in detail in Chapter 2. At the Open University, initial work in the use of badges as rewards for completion or attendance in a small number of short courses was undertaken during 2013 as part of externally-funded learning and teaching research projects. These were hosted on the Cloudworks platform (JISC & The Open University, 2013) and were issued to small numbers, in recognition for learners' participation in a community activity, submission of a piece of work and completion of tasks. Badges were also being awarded through the University's iSpot project to users for contributing an observation or identifying others' observations (The OpenScience Laboratory, 2016). This activity was not connected to the Open University's taught curriculum and did not feed into formal learning and teaching practice.

My interest in the area of digital badging inspired me to commission an internal report in 2012, undertaken by an external educational consultant, to ascertain who was issuing digital badges for educational purposes and the institutional risks and benefits of doing so. The report stated that:

“Individual enthusiasts account for many of the early badging initiatives and a Digital Media and Learning (DML) competition has been used to encourage experimentation and innovation in this area (Humanities, Arts, Science, and Technology Alliance and Collaboratory, 2012). It is evident from competition entries that USA organisations feature much more than those from other countries... NASA has made a commitment to the use of digital badges in its support of the US national K12 curriculum for children ...”

(Internal Open University report, 2012).

Further, there appeared to be little involvement in digital badging from UK Higher Education Institutions at this time aside from The University of Wolverhampton and Liverpool Hope University for the DigitalMe project (DigitalMe, 2016) and by Lincoln University (Lincoln University, 2012).

The perceived risks to The Open University of adopting digital badging for its free learning provision were around that of maintaining academic credibility and high quality branding with a clear distinction being made between the value of badges and formal accreditation. The FutureLearn strategy for badging MOOC content was not clear at this time and no direct conflict of effort nor interest, could be identified.

There was, at the time that my research began, no strategic will to incorporate digital badging into mainstream teaching and learning activities at the Open University. I was also aware that there was no clear strategy for research underpinning the development and delivery of OER, no attempts to understand the motivations of learners using OER and no work to understand how the refinement of OER could benefit the institution and learners, including the University's own students. Coupled with the fact that increased tuition fees in England and Wales was negatively affecting student recruitment and retention (adopted by the Open University in 2011), it was becoming clear that the University should link research into OER provision with theorised business benefits of delivering it, to obtain empirical data.

My role afforded the opportunity to influence commissioning with my own research, exploring the overarching research question "How can the refinement of OER benefit both learner and institution alike?". I began to research the motivations of learners using OER and undertook subsequent refinements of OER provision in response to their needs. The experience of repurposing formal learning content for use as OER at the OU had not been fully researched in terms of process and cost and the impact on learning outcomes. Neither had the subsequent benefits to institutions been adequately analysed from a business gain perspective. There had also been no intent to research the pedagogical and usability issues encountered by learners using repurposed OER and how making

refinements to design and delivery of such free learning could improve outcomes and satisfaction: all issues that underpin the main research themes that this study addresses.

The disruption of being required to develop bespoke, media-rich, short courses for FutureLearn provided a worthwhile experience in how to approach the development and design of free courses and BOCs and to research the associated business and outreach impact of this activity.

A theoretical basis for this study

The research, refinement and its associated benefit and modification to practice discussed in this thesis is represented by the author in Figure 1. It summarises the relationship between research and impact against changes in technology, educational landscape and learner needs. Whilst it describes how the refinement of OER on OpenLearn is enabling improved employability, outreach and motivation to its learners as well as improving its function to support a business model, it is applicable to the international OER movement as a whole.

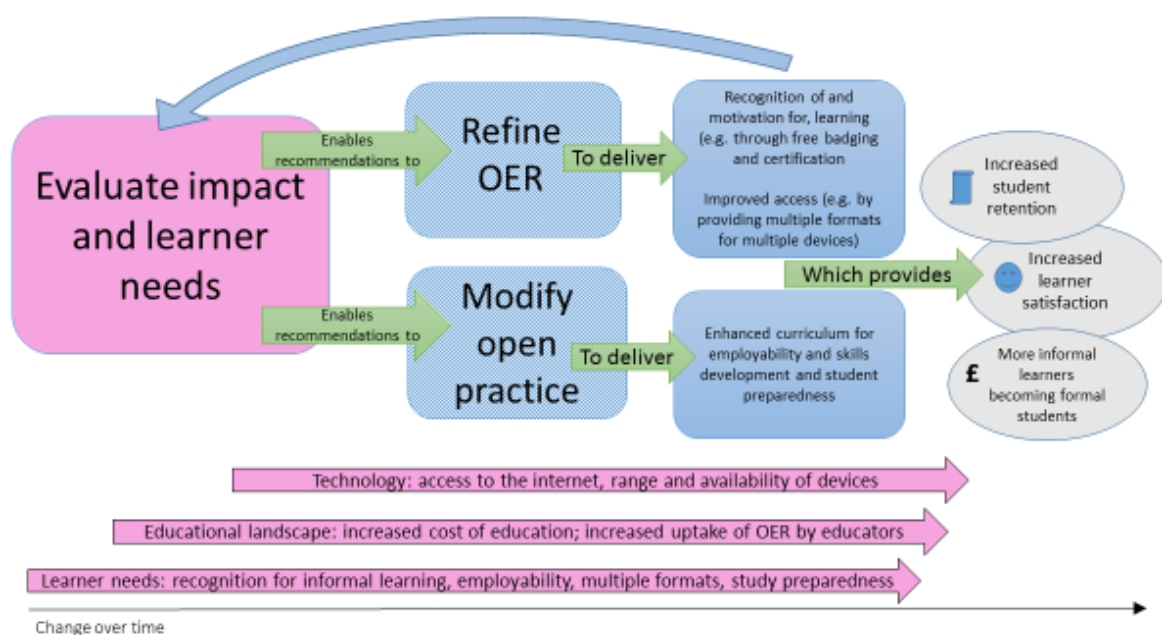


Figure 1. A framework for researching and refining OER to benefit both learner and institution.

The approach to the research and action represented through this framework is most closely aligned with pragmatism as a contemporary theory of learning. Elkjaer (2009) describes this as whereby “inquiry concerns consequences, and pragmatism views subjects as future-oriented rather than

oriented towards the past. This is evident from subjects' exercising playful anticipatory imagination ('what-of') rather than causal thinking based upon a priori propositions ('if-then')." (p.74) Elkjaer describes how this approach is different from experiential learning because it is more than just a feedback process in a closed circle of separate consequences. Pragmatism requires action and thinking and is essentially experimental. In the case of refining OER against a backdrop of rapidly changing technology and the impact this is having on access to information and learning, the approach taken in my research fits with a contemporary theoretical basis for an evolving landscape.

Biographical and contextual review of this study: a summary

This study tracks the correlation between the refinement of OER for social and pedagogical impact and the positive impact to open educational practice and the business of investing in such an activity. My introduction to OER research and large scale OER development and commissioning was set in the context of an institution that had multiple OER projects being undertaken, with no common spine of applied research around use or impact to inform strategy and commissioning. OpenLearn in particular was a world class provision of free learning with a significant budget yet had received very little consistent research. Further, the institutional business case for OER provision was not well formed, nor regularly interrogated.

My role as an OER commissioner allowed me to connect research into learners' experiences, expectations and desires of using OER with the practice of delivering it, and to influence internal open educational practice at a time when external factors presented extensive challenges and opportunities. I was granted permission to undertake research, with administrative support in planning and the delivery of questionnaires and follow-up analyses from colleagues in IET, but undertook all the associated planning, proposals, data analysis and report writing in my own time.

Recommendations from this research around fundamental changes to the learning management system used to deliver the OU's OER and the resources required to improve OER delivery (within the hypothesis that this would also improve business impact) were presented to colleagues and to the

governing structures, Directors and the then Pro Vice Chancellor (Learning & Teaching). With acceptance of these recommendations, I was able to pilot digital badging in free courses, influence commissioning strategy in response to learner needs and through project work, provide guidelines for the extensive refinement of formal taught modules for their use as OER.

As an applied researcher working in a professional role, this opportunity presented a favourable juncture of circumstances with which to research, refine and pilot new OER, experiment with recognition for informal learning and influence open educational practice in support of the business and social mission of the Open University. Whilst the hitherto lack of activity in this area may appear critical of the activities of policy-makers and OER researchers at the Open University at the time, I was (and remain) supported and encouraged by such colleagues in my endeavours. A timeline setting out the educational and technological landscape, including significant internal developments, and how they relate to the research presented in this thesis is shown in Figure 2.

The literature review for this study (Chapter 2) reveals how definitions of informal learning have not fully addressed the impact of technology nor the desires of learners to have their informal learning achievements recognised in a modern technological landscape. Literature theorised the business benefits of OER provision but lacked empirical data to provide evidence of this. The recent application of digital badges to education has been theorised in the literature but lacks a robust spine of case studies from which to evidence impact. Further, there was no evidence in the literature of the application of digital badges to OER and their potential to enhance outreach and business impact.

This study provides a reframing of informal learning in a modern context. It has revealed the challenges of repurposing formal learning content as OER. The work revealed in this study has made a contribution to the field in understanding the motivations of informal learners using OER. Critically, by responding to the needs of informal learners, this study has shown a virtuous relationship between the refinement of OER to serve both business and social goals, particularly through the application of open digital badges.



Figure 2. Timeline setting out the educational and technological landscape, including significant internal developments, and how they relate to the research presented in this thesis.

Key to acronyms used in Figure 2

- B2S Bridge to Success (Bridge to Success, 2012)
- HEAR Higher Education Achievement Report (HEAR, 2016)
- OLnet Open Learning Network (OLnet, 2016)
- VLE Virtual learning environment
- VoIP Voice Over IP

Methods

Livingstone (2006) notes “To study self-directed informal learning using sample survey techniques ... we have to strike a resolve to focus on those things that people can identify for themselves as intentional learning projects or deliberate learning activities beyond prescribed curricula and without externally authorized instructors. Documenting informal training requires a... reliance on respondents’ self-reports... Such measures can at least provide benchmarks for understanding the extent and changing patterns of informal learning activities.” (p.208) He goes on to say that “...researchers do have to engage in an initial orienting process precisely because most people do not register much of the informal learning they do until they have a chance to reflect on it.” (p.217)

For me, this orienting and reflecting process has taken place in the context of my methodology, through the analysis of learners self-selecting to participate in a survey relating to the provision of free learning. Further, that those learners have chosen to enrol on a free course. Hence, I primarily used quantitative data collection methods via the issuing of surveys, with associated website analytics, and qualitative data collection via open comments in surveys. See Table 1 for a breakdown of methods used for the publications discussed in this thesis.

Table 1 Methods of, and rationale for, data collection.

	Method	Rationale for method	Response	Year	Discussed in
1	Mixed method survey. Self-selecting respondents. Linked from a range of OpenLearn courses.	To reach learners on a self-selecting basis* who had chosen to engage with an OpenLearn course (versus other type of format e.g. video/ audio) capturing demographic data and motivations to study a course.	904 over a 3-month period.	2013	Publications 3, 4, 5, 6, 7, 8 and 11

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2	Mixed method survey. Self-selecting respondents. Linked from courses on iTunes U.	To reach learners on a self-selecting basis who had chosen to engage with an OU course (versus other type of format e.g. video/audio) capturing demographic data and motivations to study a course.	2,200 over a 3-month period.	2013	Publications 3, 4, 5 and 6.
3	Mixed method survey. Self-selecting respondents. Linked from a range of OpenLearn content.	To reach learners on a self-selecting basis engaging with all content types on OpenLearn capturing demographic data and motivations to use the platform.	1,067	2013	Publication 4
4	Mixed method survey. Self-selecting respondents. Linked from a range of OpenLearn courses.	A repeat of the 2013 course survey to compare data and note any trends or changes over a 12-month period.	741 over a 3-month period.**	2014	Publications 5, 7, 8 and 11
5	Mixed method survey. Self-selecting respondents. Linked from the end of the pilot badged courses on OpenLearn.	To reach learners on a self-selecting basis who had chosen to engage with one of the pilot badged courses (<i>Succeed with maths</i> or <i>Learning to learn</i>), capturing demographic data, motivation to study the course and earn a digital badge.	194 during pilot (4 months)	2014	Publications 6, 7 and 9
6	Mixed method surveys. Self-selecting respondents. Linked from the start and end of six BOCs on OpenLearn.	To reach learners on a self-selecting basis who had chosen to engage with one of six BOCs, capturing demographic data, motivations to study the course and earn a digital badge.	1,942 over a 5-month period.	2015	Publications 7, 9 and 10
7	Telephone interviews to informal learners – respondents of the 2013 Openlearn and iTunes U surveys (items 1 and 2, above) – who had declared a disability and who approved being contacted for further research.	To learn about disabled learners' experience of the OU's OER in more depth and to gather open responses about what could be improved. Planning and interview transcription supported by IET.	16 approached; 5 interviewed.	2015	Publications 8 and 10
8	Mixed method survey. Issued to 10,000 OU students across undergraduate and postgraduate qualifications.	To reach formal OU students in order to ascertain usage of OpenLearn, their motivations for use, perceived outcomes and issues with the platform's provision.	1,127	2015	Publication 9
9	Internal university student performance analytics.	To assess OU students who identified as being an OpenLearn user to examine any correlation with retention, versus those students who identified as not being a user of OpenLearn.	N/A	2015	Publication 9

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10	Mixed method survey. Issued by email to 250 respondents of 6, above, who had declared they would be sharing their badge with an employer.	To learn from those who had opted in to be contacted for further research.	105	2015	Publication 10
11	Mixed method survey. Self-selecting respondents. Linked from a range of OpenLearn courses.	A repeat of the 2013 and 2014 course surveys to compare data and note any trends or changes.	1,362	2015	Publication 11
12	Platform analytics	Moodle, Google and ComScore analytics are able to provide data relating to visitor numbers, dwell times, search engine queries and onward journey of learners.	N/A	2013-16	Publications 3-11

** Enrolment and provision of an email address is not necessary to use OpenLearn content. Hence the need to provide links on an opt-in basis from within content pages.*

*** The 2013 and 2014 OpenLearn surveys remained open after first analysis for Publications 3 and 4. At time of analysis for Publication 7, they were closed had attracted 1,177 and 3,133 responses, respectively, noted above.*

Published work in the OER field is wide-ranging in terms of the breadth of OER type, strategy and delivery available and hence associated methodology applied to research. Publications on the application of digital badging are more narrow and have tended to be case study-based and reports of project outcomes, with little or no availability of broad statistical data given that its application in education is a more recent phenomenon.

I regularly undertake desk research on developments in digital badging in order to stay abreast of their application to education. Similarly, during my tenure in the IET, I actively sought to follow the high-profile philanthropically-funded projects (mostly US-funded) to produce and evaluate the uptake of OER and these projects' outputs at the time in order to positively influence my approach to the delivery and research of OER.

When I began to instigate my own research reported in this thesis, preliminary desk research was undertaken to gain insight into the work of others and to ascertain where gaps in knowledge existed. Based on this, and particularly in relation to surveys undertaken with OpenLearn learners, surveys undertaken for this study were always concluded with a request for respondents to be contacted for further research. Such follow-up studies were issued to learners declaring a disability and to BOC

learners specifically undertaking informal learning for professional development to learn more about the impact on them of earning a badge.

For the survey issued to formal OU students (item 8 in Table 1), I worked through the University's Student Statistics Support Team (SSST) as a mandatory activity and complied with the Human Research Ethics Committee (HREC) guidelines. (The SSST are responsible for sampling formal OU students for any research to ensure that over-surveying doesn't take place and in order to target using preferred survey-issuing mechanisms.) At the start of my research into OER users, studies involving self-selecting human participants using informal learning did not require the work of the University's HREC for logging and approval. Hence the survey detailed as item 8 in Table 1 is the only survey that required HREC approval. In fact, HREC were approached for approval for the telephone interviews detailed in item 7 of Table 1 in 2015 because it was possible that some of these respondents may also be formal OU students; HREC confirmed that they did *not* need to give their approval for that particular study. Current practice, particularly in light of the EU General Data Protection Regulation (GDPR) of 2018, requires research involving self-selecting informal learners to be logged and approved by the HREC.

It is important to acknowledge the potential subjectivity and bias of the author in researching non-formal learners, particularly those using OpenLearn, for which the author was a lead commissioner during much of the period that the research for this thesis was undertaken. This may have led to unconsciously compromising an objective view of the data and miss occasions to delve deeper into it.

Response rates to questionnaires are given in each publication and in Table 1 where a review of data is provided both from studies of learners globally using OpenLearn, third-party platforms and the Open University's formal students. Data was also shared with the OER Research Hub and contributed to the body of knowledge gathered and published as part of that project.

This activity overall provided new knowledge that I was able to publish, particularly in the fields of OER provision and research, and digital badging. It enabled the identification of further areas of research and provided a sound basis for internal business recommendations.

Chapter 2. Literature review

This chapter begins with a discussion around the definitions of informal and non-formal learning, how delivery and access to such learning has changed with the availability of new technologies, and how use of the terms has changed over time. In addition, the ways in which the literature has dealt with the supposed benefits and function of OER during the period of my research is explored and the growing application of digital badges to education.

The boundaries of this literature review reflect the time during which the papers were written with the earliest paper cited as 1993 in a discussion about definitions of informal learning. For digital badging and its application to education in particular, no literature existed in this area until early blogging on this subject in 2012.

At the start of a career that touched on research, the notion of “Journeys from Informal to Formal Learning”, or “JIFL”, as it was known in The Open University, was widely understood institutionally. In the context of my role, my initial understanding as a practitioner was that all learners using OpenLearn, watching a free educational video on YouTube or sponsored BBC broadcast were **informal learners**. Those that specifically self-identified through surveys on OpenLearn as **educators** or **formal students** using OER became apparent over the course of my research, but in explaining the *offering* of free educational content per se, this was all categorised as **informal learning provision** – a particularly Open University-centric use of the term. As a large educational institution, the use of term ‘informal’ to describe free learning provision was accepted parlance (despite not necessarily being recognised elsewhere) and is a term I have used in several of the titles for the publications in this thesis.

The various perspectives that help explain the conflation of these terms is discussed in this chapter. They arise from a variety of contexts with which to explain informal learning – work-based, self-directed and education-led – and are important to the central ideas of this study in a time of rapid technological change and movements in learners’ attitudes to having a social, digital presence.

Further, definitions have not adequately evolved with the advent of new technologies and there remains a tension in applying old, established terms to informal and non-formal learning in a modern, digital context.

Defining informal and non-formal learning

Wikipedia provides a modern definition of **informal learning** as one that is a “pervasive ongoing phenomenon of learning via participation or learning via knowledge creation, in contrast with the traditional view of teacher-centered learning via knowledge acquisition. The term is often conflated, however, with non-formal learning, and self-directed learning” (Wikipedia, 2016). There are a number of deviations from this definition which are discussed below in literature that seeks to develop frameworks and identifying features in educational and work-based contexts i.e. it is context-specific and within that, deviations occur.

Eraut (1999) describes many informal learning activities as being those that are only recognised for what they are after the fact and that the gaining of new skills or knowledge may begin only in an incidental manner. Further, Eraut (2000a) later goes on to completely dismiss informal learning as a term with which to engage with any meaning. He describes it as something that has “so many other features of a situation – dress, discourse, behaviour, diminution of social differences, etc. – that its colloquial application as a descriptor of learning contexts may have little to do with learning per se.” (p.114). In a similar vein, The Organisation for Economic Cooperation and Development (OECD, n.d.) describe informal learning as “never organised, has no set objective in terms of learning outcomes and is never intentional from the learner’s standpoint. Often it is referred to as learning by experience or just as experience. The idea is that the simple fact of existing constantly exposes the individual to learning situations.” (OECD, n.d.)

Watkins and Marsick (1993) and Stern and Sommerlad (1999) writing from the perspective of workplace learning however, do not dismiss informal learning as a term. They suggest that formal and informal learning should not be seen as discrete categories but as the extreme poles of a continuum.

Eraut (2000a) alights upon **non-formal learning** as a term to be a worthy juxtaposition to **formal learning**: it is not provided by an educational institution and has no associated award, in direct contrast to formal learning where there is the presence of an educator, a prescribed framework and that learning is an organised activity. Within non-formal learning he argues that there are distinctions in levels of learning intent where at one end of the scale is deliberative learning with “time specifically set aside for that purpose” and at the other, implicit learning, where there is “no awareness of learning at the time it takes place” (p.115).

Billet (2001), also writing from the perspective of workplace learning, does not address the term non-formal learning per se. He argues that learning is part of all human life and is something that takes place outside of formal educational settings with formal and informal learning being equally valuable in the formation of skills.

Beckett & Hager (2002) take this view further, suggesting that learning is a holistic process to people and that informal learning as such is both more common and more effective than formal learning. They argue that informal learning is driven by an individual, rather than by teachers or trainers. A European Community (EC) commissioned document defined three categories of learning in 2001 – informal, non-formal and informal learning – with non-formal learning identified as sitting on this sliding scale between informal and formal (Unspecified, 2001). These categories of learning were defined as:

- Informal learning: “Learning resulting from daily life activities related to work, family or leisure. It is not structured (in terms of learning objectives, learning time or learning support) and typically does not lead to certification. Informal learning may be intentional but in most cases it is non-intentional (or “incidental”/random).” (p.32)
- Non-formal learning: “Learning that is not provided by an education or training institution and typically does not lead to certification. It is, however, structured (in terms of learning

objectives, learning time or learning support). Non-formal learning is intentional from the learner's perspective." (p.33)

- Formal learning: "Learning typically provided by an education or training institution, structured (in terms of learning objectives, learning time or learning support) and leading to certification. Formal learning is intentional from the learner's perspective." (p.32)

The EC definition of non-formal combines elements of Eraut's definition of formal (a prescribed framework to study) with his definition of non-formal (no certification and no educational institution involvement) and in doing so, broadens the definitions available in the literature. However, whilst the advantages of Eraut's work and the definitions provided by the EC are such they provide a learner-centric perspective, the disadvantage of applying them stem from the era in which they were written and hence the absence of digital technology as any organising principle.

Later in the literature Marsick (2009) highlights the need for "a unifying framework for understanding informal learning" (p.267) that would enable comparison by theorists and educational practitioners and provide an agreed set of principles. Even within workplace settings, Marsick acknowledges that this is almost always context-specific and that it is difficult to capture the details of learning when it is intertwined with work. Whilst Marsick does not discuss non-formal learning in her analysis nor bring in the influence of technology on learner behaviour, she defines informal learning in the workplace as taking place "within three basic strategy configurations: extended training, directed reflection, or reflective innovation" (p.267) which is indeed aligned with the EC definition of non-formal learning. It helps to illustrate why there is a conflation of terms as described in the Wikipedia definition of 2016.

Whilst Eraut (1999; 2000a; 2000b), Billet (2001), Beckett & Hager (2002) and Marsick's (2009) work show some agreement that learning types can be described on a sliding scale, although as discussed, their definitions of informal learning differ significantly. They refer to the workplace setting and partially align with the EC definitions of lifelong learning for policy. However, Livingstone (2006) draws on other contexts – theories and ideas around adult education. He further demonstrates the

conflation of meaning between informal and formal learning in his analysis of a wide range of literature around continuing education, much of it North American. Livingstone (2006) noted this conflation when he wrote: "Drawing boundaries between forms of learning can be very difficult. Distinguishing teachers from learners is often complicated in educational settings in which extensive interaction or independent inquiry are encouraged." (p.205)

Livingstone (1999) had earlier defined informal learning as "any activity involving the pursuit of understanding, knowledge or skill which occurs outside the curricula of educational institutions, or the courses or workshops offered by educational or social agencies" (p.51). Livingstone (2006) went on to say that "forms of intentional or tacit learning in which we engage either individually or collectively without direct reliance on a teacher or an externally-organised curriculum can be termed **self-directed or collective informal learning**" (p.2).

Through Livingstone's lens on adult education he sees non-formal education or **further education** as that which is a teacher-led, structured curriculum which is followed voluntarily. Further, Livingstone (2006) argues that "When teachers or mentors take responsibility for instructing others without sustained reference to an intentionally organized body of knowledge.... such as guiding them in acquiring job skills... the form of learning is **informal education or informal training**." (p.204) thereby placing educators as the organising principle for all categories of learning thus far defined.

Livingstone's approach is more relevant to the work of understanding the use of OER by learners and the field within which this thesis is set given that it is based on the experience of researching adult learning. However as with those who draw on work-placed settings, it needs some stretch of the imagination to apply it to informal and non-formal learning in the context of OER in a digital setting.

The literature has provided a useful basis from which to describe learners' interaction with, or receipt of, OER, because it draws out implicit or intentional interaction with learning in a variety of contexts. A learner-centric view of learning (versus educator-centric) resonates with the work in this thesis, particularly relevant to the use of OER and perceptions that the modern non-formal learner may make

of themselves. However, the definitions and the various conceptual elements within the definitions do not reflect a modern context in which technology has changed access to learning. Further, the literature that discusses definitions of informal, formal and non-formal learning has developed to include two broad camps: work-based learning and learning provided by social agencies or educational institutions. Hence, non-formal learning applied through the work in this thesis is one that combines elements of Livingstone's learner-centric view with the modern, technological landscape and can be defined as: self-directed engagement with the provision of learning materials in a variety of contexts and through a range of technological affordances.

This intersection of definitions described in the context of a changing and increasing access to free learning and changes in technology are expanded on below.

Access to free learning

At the turn of the twentieth century when Livingstone first started assessing informal learning definitions, the OER revolution – critically, the OpenCourseWare initiative (1999) and the Creative Commons licence (2001) – was just becoming known. This was around eight years before the first MOOCs were published and more widespread access to so-called Web 2.0 technologies, and 2006 was the year that OpenLearn was launched by The Open University.

At this time, writers began to note the impact of Web 2.0 technology on approaches to learning. McLoughlin & Lee (2007) argued that modern society embraces an environment for learning on demand; Selwyn (2007) noted the direct impact and importance of social media to support informal learning; and Clough et al. (2007) the impact of mobile devices in support of social online learning. Dabbagh and Kitsantas (2012), in studying learning approaches of undergraduate students, noted the use of social media tools by students for learning, under the umbrella description of Personal Learning Environments (PLEs). They note that these are by their nature, self-directed and are a learner-centred view of learning, examples including blogs, the use of YouTube, Google Docs, Twitter and wikis. Students form their own informal learning communities using PLE – or Web 2.0 – tools. "Learners

constantly seek information to address a problem at work, school, or to just satisfy a curiosity. To do so, they take advantage of digital and networked technologies not only to seek information, but also to share information” (p.3) and that “...PLEs can serve as platforms for both integrating formal and informal learning and fostering self-regulated learning in higher education contexts.” (p.3)

Over the course of conducting my research, it became clear that HE professionals amid whom I was working, referred to two camps of learning to describe the use of paid-for and free educational provision: formal and informal learning, respectively. The literature I was examining (discussed in the previous section) sought to explain *three* camps – **informal**, **non-formal** and **formal** – but even here, there were grey areas plus Livingstone’s additional categories of **self-directed** or **collective informal learning**, which does not allow for informal learning itself, being self-directed. The literature does not provide a neat description of the *provision* of informal learning as expressed by the Open University as a means to describe the publication of OER as a business proposition, but instead focuses on the learner as recipient, reflector and/or self-director.

These different constructs on learning have provided a starting point from which to explore how learners and educators engage with OER particularly with the growth in access to new technologies and social media. In the context of making scholarly and business recommendations and in my research of OpenLearn one could argue that across the spectrum of definitions, informal and non-formal learning are taking place. **Informal learning** remained an accepted term with which to examine engagement with free learning materials because of the mixture of approaches being taken by learners and the varied contexts in which they were learning.

It is Eraut’s (1999) notion that informal learning is incidental that fits with the approach taken by many who have ended up browsing educational content provided by educational institutions for free, and within that group, any learner searching for information that is filtered by a search engine. For the majority of the research presented in this thesis, learners’ increasing access to OpenLearn as a result

of searching for information, is continually propelled by the ubiquitousness of the Internet through mobile devices.

This increasing availability of the Internet has increased online access and has served the OER community well in providing more routes to access free learning. For this study it has also provided an opportunity to review definitions of informal learning through the lens of large-scale OER provision, later discussed in Chapter 3.

The rationale for OER

In the Hewlett Foundation white paper of 2013 (The William and Flora Hewlett Foundation, 2013) it is stated that “Since the Hewlett Foundation began investing in open educational resources in 2002, the field has blossomed from the seed of an idea into a global movement” (p.6). The organisation funded MIT’s online course project -- OpenCourseWare – and continue to support the movement declaring “OER is poised to improve access to and quality of schooling for students, self-taught learners, educators, and institutions around the world” (p.6). They describe OER as “teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge” (The William and Flora Hewlett Foundation, 2016).

The Organisation for Economic Co-operation and Development (OECD, 2007) states that “OER is ... a fascinating technological development and potentially a major educational tool.” Further, that “It accelerates the blurring of formal and informal learning, and of educational and broader cultural activities.” (p.9)

The OECD authors noted in 2007 that OER was part of a trend of openness that complemented other ideological trends occurring at the time such as in the sharing of software programmes and research outcomes. D’Antoni (2009) further describes this rush of interest in the potential of internet

technologies for distance education as an “irrational exuberance that characterised the time” (p.4). It was, according to Materu (2004), the **o-decade** (open source software, open access publishing, open standards). In 2007, the OECD (OECD, 2007) identified “over 3,000 open courseware courses available from over 300 universities worldwide.” (p.10). Instead of reshaping itself to become involved in online learning programmes at this time, MIT took a different approach. In 1999, it announced that it would develop MIT **OpenCourseWare**, which D’Antoni (2009) describes as “an adventure that became the model for open sharing of educational content that was presented to the international meeting at UNESCO in 2002 when the term Open Educational Resources was adopted.” (p.5)

Although Google now provides a filter to search by educational provider and by licence, the current availability of free courses, educational videos or open textbooks now available as OER is hard to quantify, as the number of projects, OER types and providers has expanded so greatly. For example, OpenLearn now hosts over 900 free courses; the OU’s channel on YouTube hosts over 2,500 videos; and MIT’s OpenCourseWare site alone lists 3,417 free courses in its catalogue.

Despite citing the Hewlett Foundation’s definition of OER (The William and Flora Hewlett Foundation, 2016) Witthaus et al. (2016) describe three types of **open learning** with associated characteristics: open education/open universities; MOOCs; and OER.

The use of **educational** within the term **OER** has been minimally discussed in relation to its intersection with informal learning. Downes (2006) argues “It seems clear, based on the discussion, that there ought not be an *a priori* stipulation that something may, or may not be, an educational resource. Such stipulation may only serve to limit discussion unproductively.” (p.3) Further, that “it should be clear that learning extends beyond the scope of formal learning, and hence that resources not used in a formal environment may yet be instances of OERs.” (p.3) Through the broad uptake of OER as informal learning provision we have moved a long way from viewing OER as being materials mostly provided for teaching as self-directed informal learners make use of OER provided by educational institutions in the modern day. The OECD (2007) review provides a useful alternative when considering this

crossover of OER and informal learning: “It is sometimes argued that to acknowledge and strengthen the importance of this role of OER, the term “education” should be replaced by “learning” and a better term would be “open learning resources” but chose to keep the term OER given that the movement had grown so rapidly and that it would be “unwise” to change it. (p.36)

A positive rationale for OER was neatly summarised by the OECD in their 2007 paper (Table 3) and remain largely unchallenged today. I have provided an up-to-date analysis in my final paper for this thesis, of the supposed benefits of OER particularly in relation to its function as a sustainable business model, citing Dholakia et al, 2006; Downes, 2006; Koohang et al., 2007; Guthrie et.al, 2008; Lane, 2008; Wiley, 2010; Bitter-Rijpkema & De Langen, 2012; Daniel, 2012; Stacey, 2012; UNESCO, 2012; and de Langen, 2013. The subject is also discussed and brought up to date in Chapter 3.

Table 3. Drivers, inhibitors and motivations for developing and sharing open educational resources (adapted from OECD, 2007, p.70)

Governments	Institutions	Individuals
Widening participation in higher education	Altruistic reasons	Altruistic or community supportive reasons
Bridge the gap between non-formal, informal and formal learning	Leverage on taxpayers’ money by allowing free sharing and reuse between institutions	Personal non-monetary gain
Promote lifelong learning	‘What you give, you receive back improved’	Commercial reasons
	Good public relations and showcase to attract new students	It is not worth the effort to keep the resource closed
	Growing competition – new cost recovery models are needed	
	Stimulate internal improvement, innovation and reuse	

Where OER provision was ostensibly preoccupied with the delivery of lecture notes and video lectures at the turn of the century, it now incorporates entire project and business endeavours to release OER as structured courses and the growing movement in the US to release core undergraduate text books

as OER. Indeed, research and literature is dominated by US-funded and US-focused OER initiatives. Some **Massive Open Online Courses (MOOCs)** could now be viewed as a subset of OER, where they make use of the intellectual property licence. However, whilst there are exceptions, MOOC platforms tend to release copyrighted material that does not permit them for free use and repurposing and do so for commercial purposes. In terms of their place within the rationale for OER, this is discussed in more detail in Chapter 3 in setting the context for Theme 3 (The refinement of OER in support of the social and business mission of delivery free learning).

Since its first outing by MIT, OER has developed over time and has reached new audiences with the increasing rise in access to the Internet and through mobile technology. Despite this increasing OER provision and uptake, at the time the research undertaken for the publications in this thesis was being undertaken, literature had not examined the demographics, motivations, desires nor intentions of users of OER, but instead focussed on a rationale for OER and theoretical business models for its provision.

With this increasing provision of, and access to OER, came a panoply of open technologies and principles that characterised the first decade of the 21st century, and the development of digital badges in 2012, a philanthropically-funded digital open technology standard designed to reward learning. Whilst not directly linked to OERs at the time of their release they provide an opportunity to reward informal and non-formal learning, an opportunity explored and researched by the author, and described in more detail in Chapter 3.

The origins of digital badges

Digital badges themselves are digital tokens of accomplishment. They can contain claims and evidence about learning and are intended to circulate in social networks that badge issuers and earners participate in (Knight & Casilli, 2012). O'Byrne et al. (2015) provide a complementary and more detailed definition of digital badges to be:

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“... visual representations of learner accomplishments... that... can contain specific claims regarding what the earner learned or did, and detailed evidence supporting those claims. Badges usually consist of an image and relevant metadata (e.g., badge name, description, criteria, issuer, evidence, date issued, standards, and tags). This makes it possible for viewers to click on a badge and see the artefacts the learner created to earn a specific badge.” (p.452)

The origins of digital badges used as a rewarding feature in online gaming is noted as a precursor to their application in education (Antin & Churchill, 2011; Deterding, 2011; Dominguez et al., 2013; Hamari & Eranti, 2011; Giannetto et al., 2013; Haaranen et al, 2014; Ostashevski & Reid, 2015; and Whitton & Moseley, 2012). An early example of digital badges being issued as a marker of achievement in a non-formal learning context is noted by Ostashevski & Reid (2015). They describe the Stack Overflow website (an online community for programmers to learn and to share their knowledge) as issuing digital badges as “little bits of digital flair that you earn for almost every kind of activity... The number and type of badges you’ve earned are displayed together with your username and reputation score around the site...” (p.190).

In April 2012, the Mozilla Foundation saw an application for digital badges in learning contexts and launched the beta version of the open badge specification. Within three months, it had 100 unique issuers of digital badges using this specification. A year later, they launched a fuller specification of open badges, including both the open standard and associated guidance to issue, and by mid-2013 there were over 700 unique issuers (Ostashevski & Reid, 2015).

Digital badges in education

As a field of research, digital badges and their application to education is still very young. The publications in this thesis examines the pilot project led by the author to apply them to OER as a means to recognise informal learning on OpenLearn and their impact to the Open University in support of a business case for OER. They are core to the central theme of this study in that they represent an important change to approach in developing and refining OER to meet the needs of informal learners

by associating them with online assessment and a richer learning experience. This is shown by the author to deliver a more impactful bridge to formal learning than existing provision (whereby formal learning is simply being made available online) and to influence open educational practice at the Open University.

At time of writing, the first systematic literature review of the term 'open badges' (using the English language only) had been published (Liyanagunawardena et al., 2017) noting it to be a very young field, with North American writers dominating the landscape and only a very recent (2016) rise in journal articles over conference papers. This systematic review for 'open badges' was limited by not considering the term 'micro-credential' and included studies in schools and other badge issuing projects and theories applied outside of the education sector.

Publication 10 of this thesis (Law, P., 2016b), raises the issue that the early writers of digital badging, both detractors and supporters, were largely columnists and bloggers. Some argued that mainstreaming of badging into the digital world was disruptive, dangerous if poorly employed and unlikely to have any comparative value to formal qualifications (Crotty, 2012; Halavais, 2012; and Jenkins, 2012).

Halavais (2012) in particular argued that "To look at how some badges have been used in the past and not be concerned about the ways they might be applied in the future would require a healthy amount of selective perception. I have no doubt that badges, badly applied, are dangerous" (para. 5).

Eisenberg (2011) was early to note the potential for the purpose of issuing digital badges as an addition to formal qualifications: "The badges will not replace résumés or transcripts, but they may be a convenient supplement, putting the spotlight on skills that do not necessarily show up in traditional documents" (para. 3).

With reference to the functionality of digital badges inasmuch as they contain metadata, or 'baked in' information about the achievement, Gibson et al. (2013) argue that "...digital badging can provide an effective, transparent, and often user-centric manner in which to display evidence of learning while

directly linking to information that is needed to understand, authenticate and validate the badge and the learning that it claims to represent.” (p.409)

Giannetto et al. (2013) were early to describe the potential of digital badges in education as having three uses: a means to provide positive feedback, affording a mechanism for students to share their achievements and the means for students to foster a sense of accomplishment. However, early skeptics of the application of digital badges in education within a curriculum of study argued that the use of digital badges as a motivational tool to complete a course of study delivers the badge to learners as the goal, rather than the learning itself (Herron, 2012; Ostashewski & Reid, 2015).

Ostashewski & Reid (2015) go on to note that “Even with similar models in the literature, there are often vastly different viewpoints of the purpose and use of digital badges. This is likely due to the new and emerging nature of digital badges and the overlap of education and computer science perspectives of implementation.” (p194) They go on to note the potential use of digital badges in education to function as “feedback, motivation, catalysts for discussion, and socially sharable.” (p.194)

However, a case study described by McDaniel & Fanfarelli (2015) explains how their application of digital badges had moved beyond a motivational tool when combined with providing information to recipients, to a means of enhancing feedback.

Jacobs (2012) noted that colleges and universities would face significant competition if badges proved their validity as credentials and were offered for free “only if badges are proven credible”. Hamilton (2014) put the credibility or otherwise of the badges themselves as lying firmly in the hands of employers and educational institutions and their willingness to endorse them.

Other writers and bloggers have used the term ‘micro credential’ to describe the function of digital badges in support of employability and skills that fall outside of the traditional curriculum (Gamrat et al., 2014; Gibson et al., 2013; MacKinnon, 2016; and Snyder, 2016). Casilli (2016), a prominent writer about open badging and who was Director of Badge System Design at the Mozilla Foundation for the implementation of the open badge specification, usefully unpacks this notion of the micro credential:

“Badges were designed... to operate in liminal spaces... badges are dynamic... informal social tokens that can fill the spaces that other learning acknowledgements leave fallow... Badges let us move into a new world of inclusive... learning recognition, affiliation, achievement, etc., replacing the restrictive “either/or” world of traditional credentials... They bring free and unencumbered learning recognition into the spaces starving for it” (paragraph 2).

MacKinnon (2016), in her summary blog about the first ‘Badging for HE’ conference in the UK in 2015 notes that “the use of open badges as a form of micro credential in a wide range of educational contexts has been around for a while, but has not gained much traction in HE” and that “There can be little doubt that employability is a concern for students in the UK who face large debts on graduation” (paragraph 10).

In the IT industry in particular, digital badges are awarded for completion of software and hardware training with a direct link to employability. IBM are noted as being the major proponent of digital badges in this area and who launched the IBM Open Badge Program in 2016. The programme now manages over “800 badgeable activities” and in its first year, issued badges to over 200,000 people (Leaser, 2017).

In 2015, Deakin University was the first university to combine online badged courses with a 1-1 video interview to provide a recognised prior learning component accounting for half of what is required for a professional practice master’s degree (Shaffhouser, 2015). Indeed, the Open University will now consider its own digitally badged courses as part of a recognised component to learning as part of formal credit for its Bachelor’s Open Programme and in the Law programme, bundled with assessment for formal credit.

I will return to this vision for the future in the conclusion of this thesis (Chapter 5), whereby recognised study of OER plays a role in a new journey towards formal credit, currently an under-researched area.

Literature review: a summary

This literature review begins with examining definitions of informal and non-formal learning and notes that the majority of definitions expressed and data gathered are framed by learners' expectations and outcomes in a work-based context.

Literature does not discuss the impact of digital technologies on such definitions, nor the emerging group of informal learners who seek to have their achievements recognised. In other words, the desire to receive recognition for informal learning, becomes another step on the continuum from informal to non-formal learning, and in some cases, to augment formal learning. Literature around OER does not examine the motivations, experiences and desires of those undertaking learning informally outside of a work-based context. Business models and a rationale for OER expressed in literature are largely focused on theoretical constructs that are not underpinned by empirical evidence.

This thesis addresses outdated definitions by drawing on empirical evidence. It examines the opportunity to review the provision of free learning materials, the motivations of learners using them and their relationship to educational policy, and hence updates and contributes to definitions of informal learning and the rationale for OER in a modern, digital context. (A contribution to the update of definitions is outlined in the summary of Chapter 3.)

Certainly in the case of The Open University, a great deal of resource is being put into OER projects and the conversion of formal learning materials as OER on OpenLearn, an activity mirrored by other large-scale OER providers influencing the OER movement globally, such as MIT. Despite this, and at the start of this study, little data had been gathered about what learners want from the experience of using OER and how their needs have changed over time with increasing and ubiquitous access to the Internet. Further, literature remained largely US-focused or US-led, with almost no examination of one of Europe's largest OER endeavours – that provided by The Open University across OpenLearn, iTunes U and YouTube – reaching millions of learners since 2006.

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Through the refinement of OER, by introducing open, digital badges as recognition for informal learning achievements, it has been possible to reframe the use of OER and build on narrowly focused definitions of informal and non-formal learning which lacked the perspective of increasing access to technology and the Internet. It has also been possible to examine theories around the rationale for OER and to review altruistic and business claims, and theories around institutional commitment to OER provision where scant data existed.

The context within which to examine these gaps in the literature, has required the author to examine free learning delivered at scale through embedded open educational practice. This has highlighted that very high numbers of learners engage with institutional delivery of OER with widely varying intentions, a topic not examined in the literature at the start of this study, but which is key to understanding the business of OER in higher education.

Further, small case studies on digital badging for education associated with online learning, do not thoroughly explore the opportunity for recognising informal learning achievements achieved through free learning provision at scale.

Chapter 3. Interrelationship between the papers

The papers I am presenting for this PhD by Published Work reflect the phases of exploration into the repurposing and evaluation of OER, the impact of this activity and consequent modifications to associated open educational practice. What unites the body of work presented is that all the papers focus on particular aspects of the ongoing refinement of OER and my contribution to the field through the impact of recognising informal learners' achievements. This chapter builds on the areas identified for further exploration as illustrated by Chapter 2 and presents the outcomes of this research against the three research themes which have been investigated. These being:

Theme 1: The challenges of repurposing formal learning content as OER

Theme 2: Supporting the motivations of informal learners using OER

Theme 3: The refinement of OER in support of the social and business mission of delivering free learning

I have explored challenges and opportunities presented through the research into the impact of OER and applied findings from this work to the refinement of OER to meet both learner and business needs. Through this and through the deployment of open digital badging, as recognition for informal learning, my thesis makes a contribution where scant literature or case studies exist in this field.

This chapter explores this contribution with respect to each of my key research themes and the interrelationship between the publications. A more detailed explanation of the publications is found in Chapter 4. The publications are listed below.

The publications

Publication 1 Law, P., McAndrew, P., Law, A., Warner, K., Runyon, J., Lascu, D. & Muramatsu, B. (2012). A Bridge to Success. In *Proceedings of OCWC 2012: Innovation and Impact Openly Collaborating to Enhance Education*. Cambridge, UK.

- Publication 2 McAndrew, P., Farrow, R., Law, P. & Elliott-Cirigottis, G. (2012). Learning the Lessons of Openness. In: *Cambridge 2012: Innovation and Impact – Openly Collaborating to Enhance Education, a joint meeting of OER12 and OpenCourseWare Consortium Global 2012*, 16-18 April 2012, Cambridge, UK.
Also published by Farrow, R. as: McAndrew, P., Farrow, R., Law, P. & Elliott-Cirigottis, G. (2012). Learning the Lessons of Openness. *Journal of Interactive Media in Education*, 2012(2), p.Art. 10.
- Publication 3 Law, P., Perryman, L.A. & Law, A (2013). Open educational resources for all? Comparing user motivations and characteristics across The Open University's iTunes U channel and OpenLearn platform. In *Open and Flexible Higher Education Conference 2013, 23-25 October 2013, Paris, European Association of Distance Teaching Universities (EADTU)*. 204–219.
- Publication 4 Perryman, L.A., Law, P., & Law, A. (2013). Developing sustainable business models for institutions' provision of open educational resources: Learning from OpenLearn users' motivations and experiences In *Open and Flexible Higher Education Conference 2013, 23-25 October 2013, Paris, European Association of Distance Teaching Universities (EADTU)*. 270–286.
- Publication 5 Law, P. & Perryman, L.A. (2015). Internal Responses to Informal Learning Data: Testing a Rapid Commissioning Approach. *European Journal of Open, Distance and e-Learning*. 76–84.
- Publication 6 Law, P., Perryman, L.A., & Law, A. (2015). Badging and employability at The Open University. *European Journal of Open, Distance and E-Learning. Best of EDEN 2015 Special Issue*. 18 (2).
- Publication 7 Law, P. (2015). Recognising Informal Elearning with Digital Badging: Evidence for a Sustainable Business Model. *Open Praxis*, 7(4) pp. 299–310.
- Publication 8 Law, P. (2016a). Digital badging at The Open University: recognition for informal learning. *Open Learning: The Journal of Open, Distance and e-Learning*. 30(3): 221-234.

- Publication 9 Law, P. & Jelfs, A. (2016). Ten years of open practice: a reflection on the impact of OpenLearn. *Open Praxis*, 8(2): 143–149.
- Publication 10 Law, P. (2016b). The Identified Informal Learner: Recognizing Assessed Learning in the Open. In *Open Education: International Perspectives in Higher Education*, edited by Blessinger, P. & Bliss, T.J. Cambridge, UK: Open Book Publishers.
- Publication 11 Law, P. & Perryman, L.A. (2017). How OpenLearn supports a business model for OER. *Distance Education*, 38(1): 5-22.

Theme 1: The challenges of repurposing formal learning content as OER

The publications in this thesis explore the challenges associated with repurposing OER and how the benefits and challenges of producing and evaluating OER more widely, have been investigated.

Publications 1 and 2 (Law et al., 2012; and McAndrew et al., 2012) introduce the work of two early OER projects – Bridge to Success (B2S) and the Open Learning Network (OLnet) – and help to frame the challenges of the OER landscape overall.

Before the work undertaken for this thesis began, the emphasis for OER provision was on the methods of that provision and the methods of access to it, and the papers emphasise the potential of such endeavours. My work has investigated that potential with a number of empirical studies which have been externally funded.

The Bill and Melinda Gates Foundation and the William and Flora Hewlett Foundation funded a range of open learning initiatives in 2011 to “develop course content to improve college readiness and completion and to encourage students and adults returning to school, to build their confidence in whatever career path they choose” (Bridge to Success, 2012). The William and Flora Hewlett Foundation had, some five years previously, funded the first two years of the OpenLearn website and had continued to support OER projects: by 2016 the William and Flora Hewlett Foundation had provided \$10m to 38 grantees (The William and Flora Hewlett Foundation, 2017).

As a successful recipient of this funding, The Open University, with Anne Arundel Community College and the University of Maryland University College (both in the US) launched the B2S project. The project teams were able to develop and research OER with the explicit aim to examine whether the repurposing of formal introductory-level curriculum as OER could bridge the gap of student readiness in US community colleges. The hypothesis underpinning this project described in **Publication 1 (Law et al., 2012)** was that by strengthening students' core skills there would be improvements in college preparation and retention, particularly by at-risk students. This was essentially to explore "the value of open courses in supporting the transition into higher education and supporting those who might struggle with existing approaches" (p.6). The courses repurposed for OER use were extant Open University short courses designed as part of the so-called 'Access' curriculum, a precursor for mainstream undergraduate study, covering a range of core topics. Those chosen for the B2S project were basic maths and learning skills and hence were ideal for repurposing for new, at-risk US community college students with little or no formal education.

By releasing repurposed formal learning content online as free courses, the project reached a wider audience than just the colleges' students collaborating with the project. Courses were adapted for online use and enhanced with formative assessments and other activities either for self-directed study or in a classroom setting. The paper documents and critiques how the project team were the first to repurpose courses and adapt them to improve usability, specifically through the application of learning design analysis.

Further, the rationale of this joint UK-US collaboration was also to evaluate its impact and deliver professional development for educators and institutions through webinars to promote best practice in reuse of OER.

The project overall provided an opportunity to work collaboratively with US institutions and the practical experience of the challenges of repurposing formal content for a targeted purpose. **Publication 1** summarises this activity as a new approach to the repurposing of face-to-face learning content for delivery online and for a specific audience, whilst also making a contribution to the body

of OER available globally online. The publication makes a contribution in the literature of specific relevance to OER practitioners by demonstrating the use of repurposed learning material to serve a broad global audience of informal learners as well as targeted formal learners in a college setting.

Citations for all publications in this study are discussed in Chapter 4; the results of the B2S project in particular, in terms of benefit and impact were later reported by Pitt et al. (2013) and were reported by the OER Research Hub at The Open University from 2013-2016. The paper reports high satisfaction with the learning materials, an improvement in scores of those who had originally failed a college entrance examination and higher pass rates on college courses by those who had previously, or were concurrently, studying the B2S materials.

Another grant from the William and Flora Hewlett Foundation awarded to The Open University around the same time as B2S, was the Open Learning Network (OLnet) project. The aim of the project was to develop a website to share information about OER research, provide a number of visual and social networking tools and resources to support open education and share knowledge (OLnet, 2016). Explored in **Publication 2** the project employed 30 research fellows working within eight research strands over the period 2009-2012 looking at a range of national and international OER provision, its rationale and delivery. The role of the Open University was to coordinate this activity and as discussed in Chapter 4, my involvement was to support the overarching analysis and dissemination of the research fellows' findings and to extrapolate meaningful summaries and recommendations relevant to the OER community and the funder. One of the project's central outputs was to provide "lessons and challenges brought out and refined through a process of mapping the overall landscape and capturing real-world communication about OER." (p1).

In discussing the range of challenges and questions brought forward by the OLnet team and by using the B2S project as a means to exemplify many of these challenges in practice, the paper is an important flag to the OER community – both policy makers and practitioners – that despite a tsunami of initiatives to release and host OER there was still much to understand around open educational

practice, OER adoption and research. The paper identifies 12 key challenges and questions of the OER movement, shown in Table 2.

Table 2. The four categories of challenges raised by OER (adapted from McAndrew et al., 2012).

Category	Challenge
Preparation	1. Technologies and infrastructure needed/in place to help the OER movement. 2. Copyright and licensing. 3. Improving access to OER.
Common issues for learning	4. How do we ensure OER is of high quality? 5. What can be done to improve OER sustainability? 6. What evidence is there of the use and re-use of OER?
Research	7. What are the costs and benefits of using OER in teaching? 8. Institutional policies for the promotion of OER. 9. Improving the value and impact of OER research.
Emerging	10. Promoting and advocating educational methods which use OERs. 11. Creating the right culture of teaching and learning to improve OER adoption. 12. Creating new appropriate assessment/evaluation models and practices for OER.

The paper proposes some practical solutions to tackle the challenges and questions raised, based on the experience of B2S given the crossover in some of the project team members and hence, shared knowledge and understanding of the issues.

The paper recommends – for similar OER projects going forward and the institutions delivering them – that institutions delivering OER should ensure that practitioners have a better understanding of the Creative Commons licence in order to enable wider acceptance of its use. The authors also touch upon discoverability and hosting platform and how the accessibility of OER and its usability is important given its predominant online use. Critically, the paper makes recommendations for a more persistent sharing and hosting of evidence in order to improve practice, a central theme of the OER Research Hub project that followed. In response to the challenge around developing appropriate assessment practices for OER, the paper is also the first of the publications in this thesis to refer to the emergence of digital badges as a potential means to reward assessed learning.

Whilst **Publication 1** specifically looks at the challenges of repurposing formal content as OER, all subsequent work reflected on aspects of the categories of challenges identified in **Publication 2** (preparation, common issues for learning, research and emerging issues). It provided the basis on which to lead the research and refinement of the OU's OER, particularly around a weakness in the evidence base for the impact of OER and the guidance needed for OER practice. **Publication 9 (Law & Jelfs, 2016)** in particular, discusses this change in research practice and refinement of OER based on a more robust evidence base by reflecting on ten years of OER provision via OpenLearn. It considers the changes in approach to open educational practice that was directly influenced by the practical experiences of the author as a member of the OLnet, B2S and OER Research Hub project teams, and the challenges and recommendations highlighted in **Publications 1** and **2**. The paper critiques McAndrew et al.'s (2009) original and now outdated analysis of OpenLearn three years after the site was launched, in terms of how and why learners were coming to the platform. **Publication 9** highlights significant shifts in the use of technology by learners and educators since McAndrew et al.'s (2009) first analysis of OpenLearn.

Publications 9 and **10** meet the challenge of OER preparation head on by providing practical guiding principles for the OU's academics (and hence, open educational practitioners) to employ when considering adapting formal learning content as OER in an unmoderated (tutor-free) environment.

This is more extensively discussed in **Publication 9** and include:

- That informal learners value recognition for their achievement.
- That informal learners most value quizzes with associated feedback.
- That MOOCs, providing learning in closed environments with set start and end dates, have lower completion rates than their equivalents on OpenLearn i.e. that are perpetually open.
- The use of video (especially that of a tutor, or 'face' of a course) is especially valued.
- That required social activity, sometimes seen in MOOCs, encourages high drop-out.

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- That by selecting engaging and topical content within a formal module identified for repurposing as OER, makes learning more accessible to informal learners.
- Repurposed courses can be designed specifically to support induction, thereby acting as preparatory learning for new students and to keep them motivated while they wait for formal study to begin.
- That new assets, such as videos, animations and quizzes, developed specifically for an OpenLearn course can be reused in formal courses.

(adapted from p.148)

Publication 10 – ‘The identified informal learner: recognising assessed learning in the open’ – considers and critiques how the repurposing of formal learning content as OER for the OU’s badged courses provided no savings. Indeed that repurposing was as time consuming as writing from scratch given the addition of assessments and modifications to make the content engaging as a standalone online endeavour. When evaluating the business model of providing 5% of the OU’s taught curriculum as free, online courses on OpenLearn and by addressing the research question “does OpenLearn support a business model for OER?”, **Publication 11 (Law & Perryman, 2017)** reveals the cost of this conversion process to be around £1500-£2000 per course. Literature on the business rationale for institutional delivery of OER had been focused on theoretical assumptions alone and **Publication 11** reveals both institutional costs and impact of OER provision. The methodologies employed to gather this data were through analysis of internal budget data and issuing of surveys to OpenLearn learners.

Reuse of OER by educators

Whilst the repurposing of OER is not necessarily implicit for reuse, the uptake of the OU’s OER by educators is discussed in **Publications 3 (Law et al., 2013), 4, 9 and 11**. Survey respondents identifying as ‘educators’ provide a range of objectives for repurposing or reusing OER. Table 5 of **Publication 11** shows a comparison of educators’ reasons for using OpenLearn over the three years surveyed. These reasons are summarised below as:

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- Preparation, inspiration and supplementation of teaching
- Use of 'assets' (e.g. images or text extracts), online and self-study materials for learners
- To improve range of teaching methods and enhance professional development
- To stay up to date with, or learn about a new topic

In summarising three years' of OpenLearn surveys (2013-2015) **Publication 11** notes a steady 15% of all users of OpenLearn declaring that they are practising educators, over the same three-year period; important to the literature inasmuch as this proportion of the OER user population had remained steady despite increasing institutional delivery programmes. **Publication 9** reports how the OU supports such educators' reuse of OpenLearn OER by providing multiple formats of courses.

By comparing learners using Open University OER on OpenLearn, iTunes U and YouTube, **Publication 3 (Law et al., 2013)** was a critical first for the field of OER and has received 16 citations for this reason. There had been no paper, up until that point, that had examined the users of university-provided OER across a range of platforms, and makes a significant contribution to the evidence base for OER policy. My aim was to examine the research question 'What are the motivations of learners using the Open University's OER on OpenLearn, iTunes U and YouTube?', research the key demographic profiles and motivations of those learners, and look at the evidence for OER as a business model. As a first foray into large-scale qualitative and quantitative data collection around OER use the publication reveals significant demographic and motivational differences between platform users. It was also institutionally important and resulted in the termination of budget for creating bespoke OER for iTunes U, because data showed that informal learners using that channel were highly educated and unlikely to become formal students with the OU. **Publication 3** notes in particular that "iTunes U was designed to appeal to educators at all levels..." and that "The platform was originally developed for use to teach privately to groups of students who log in with a password, but it is now predominantly used to distribute free content." (p.205). Clearly, repurposing was not at the heart of the iTunes U development, particularly as some free resources delivered via the application e.g. Apple iBooks are

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only readable on Apple devices and hence difficult to reuse. Its original use by the Open University was not to support repurposing per se, but to reach new audiences. In doing so, it opened up the debate for the syndication of identical assets across multiple platforms.

Papers in this study have revealed that repurposing OER as an institutional practice and the impact on learners and educators using that OER, raises a number of challenges. By examining the practice of repurposing OER for OpenLearn and iTunes U and the audiences that use those OER, they also highlight the need to improve the value and impact of OER research in order to share and improve practice in a field of literature that in its early days, was broadly focused on theoretical assumptions of impact and OER reuse.

Contribution to the field within Theme 1

My contribution to the field against the theme ‘The challenges of repurposing formal learning content as OER’, whilst focused on the case studies of the B2S, OLnet and OpenLearn projects, has brought new insights into the institutional delivery of OER at scale. Papers highlight key challenges and approaches for meeting these challenges through the recognition and application of open education practice. They provide new practical insights for the field and pose a need for deeper understanding of learners’ motivations and outcomes of using OER, based on both large-scale data and a case study approach at a time when research was directed more on the experience and attitudes of educators. Whilst repurposing and republishing were important, intended goals for the OER movement, researching the motivations of learners and responding to this, must be a key consideration at the start of such activity and again, at the end. As noted in Chapter 4 of this study, **Publication 2** in particular has been well cited with respect to the challenges raised by OER usage.

Because the OpenLearn platform reaches around six million learners a year – a mix of educators, informal learners, non-formal learners and formal students – its use as a means to contribute to the field, particularly with respect to the challenges of OER identified in **Publication 2**, was highly applicable. OpenLearn was considered by the author as a potential rich seam of data in distance

informal learning and OER development, presenting a range of research opportunities. Given that the impact of OER at scale was not fully evaluated at the time that **Publications 1-3** were written, OpenLearn – given its very wide reach – presented itself as a potential portal to data around millions of peoples’ use of OER that had remained largely untouched by the OER research community.

Despite this opportunity, OpenLearn in particular had received little attention, yet was home to the output of one of the largest course repurposing endeavours in higher education globally. It had the potential to provide insight into the challenges of open educational practice, OER use and policy.

The challenges of repurposing OER are later reflected upon in **Publication 9**, a paper that critiques the first 10 years of institutional delivery of OER for OpenLearn. However, in relation to the particular challenge of the use and re-use of OER the paper refers to McAndrew et al.’s (2009) OpenLearn report produced at the end of the original Hewlett Foundation funding. McAndrew, notes that “the original design [of OpenLearn] considered a division between learners and educators” (p.35) in their evaluation of the platform. The site had a remix function to facilitate repurposing of content (a feature which is now part of a separate OU platform called OpenLearn Create). McAndrew et al. (2009) report that this remixing feature was not heavily used noting "Repurposing of materials is inhibited by technology literacy and the lack of familiarity with the concept" and that repurposing was seen as 'difficult', 'scary' and 'challenging'. (p.59). Further, he goes on to state that challenges to repurposing experienced by the first OpenLearn partners (collaborating communities in higher education supporting the use and re-use of OpenLearn OER) were often to do with feeling uncomfortable with the concept.

This idea that educators feel uncomfortable in reusing OER, was also expressed around the same time, by White and Manton (2011) in their study of the value of reuse of OER in higher education. They describe reluctance based on “pedagogical fit of a resource to their teaching strategy” (p.9). Dimitriadis et al. (2009) argue that "making the inherent design of OER more explicit will make them [OER] more understandable and hence reusable” (p.200) to help facilitate the notion that

"repurposing of existing [OER] resources is a means of lower costs" (p.201). Yet, while literature of the same period concurs that reluctance and discomfort prevails in the reuse of OER, few had provided empirical evidence of its repurposing at scale and assessment thereof from the educators' perspective.

McAndrew (2011) returns to this subject in 2011 in discussing the practical and pedagogical transferability of OpenLearn learning content noting that it is based on distance learning material (The Open University's) which "arguably makes it more transferable" (p.4). In reviewing a study by Wilson (2008) around educators' attitudes to using OER content more generally, McAndrew describes "a possible reluctance to accept replacement of content where the content is sourced from an organisation competing in the same market" requiring a "change in culture and practice rather than needing formal changes" (p.5).

Despite McAndrew's (2011) assertion that Open University content is transferable because its origins are from a distance education provider, the experience of the OpenLearn team in repurposing formal content for OpenLearn reported in **Publications 1 and 6 (Law et al., 2015)**, was challenging, less so from a practical or attitudinal perspective, but more from the perspective of adapting courses that were essentially socially constructivist by design and print-based, to become standalone, socially unsupported online courses requiring a strong degree of self-direction.

While there had been much discussion in the literature around attitudes towards OER, **Publication 9** makes an important contribution in revealing that an institutional and strategically-led endeavour to release OER removes some of the anxieties from the process. It moves the debate on and offers a much-needed approach, based on experience and research, to repurposing OER that is directly transferable across higher education institutions. **Publications 9 and 10** meet the challenge of OER preparation head on by providing unique practical guidance for open educational practitioners in the adaptation of formal learning for OER.

Similarly, at time of writing **Publications 1 and 2**, much of the OER landscape was dominated by lecture notes and video lectures and technological barriers may have prevented reformatting, repurposing or republishing. **Publications 1, 2 and 10** again, move the literature on to reveal the experience of targeted repurposing of learning material for OER, highlighting pitfalls (cost) and successes (impact), where literature on repurposing had focussed on attitudinal and technological challenges only and lacked critical research on large-scale projects. Notably, when creating the BOCs for OpenLearn, those written from scratch took as much author time to develop as those that were repurposed from existing material, and hence counter earlier arguments that repurposing would result in lower costs. This may have partly resulted from the requirement to create online formative and summative assessments in BOCs, distinguishing them from other non-assessed OER provision.

The challenges presented in **Publications 1 and 2**, written during 2012, reflect a pivotal time in the OER movement. There had been a rise in the number of OER providers and initiatives yet the evidence from researching the broad impact of these initiatives, the issues faced by individuals, researchers and policy-makers – which these publications addressed – had not been presented to this field.

In summary, the main contributions of this study against Theme 1 are:

- New insights into the practice of the institutional delivery of OER.
- An exposure of the many and varied motivations of learners using OER where literature had focused largely on the experience and attitudes of educators.
- Examples of the cost and business impact of open educational practice where previously the literature had provided only theoretical assumptions as to the business case of OER.

For the remainder of the publications presented in this work (2013-2017), many of these challenges identified in **Publications 1 and 2** were explored through the lens of refining OER at scale i.e. delivering to millions each year, although remain important for debates around the practice of the refinement of OER and the function of digital badging in education more widely. Further, by revealing the cost of formal course conversion, **Publication 11** provides a tangible figure from which others in the field

could consider when examining their own practice, a practical contribution to the work presented against this theme.

Theme 2: Supporting the motivations of informal learners using OER

The second theme of this thesis examines work undertaken to research the motivations of informal learners and the response – in the form of refining OER to meet informal learners’ needs – to these motivations. Prior research had not addressed the impact of educational institutions using iTunes U (which had launched in 2008) to reach millions of new learners. Osbourne (2012) had warned of the limitations of platform-specific content production and the increasing availability and type of learners wanting to access it. However the literature overall had not revealed the demographics nor motives of learners choosing to use mobile devices to access OER.

Publication 6 draws particular attention to the distinctions made between informal and formal learners, and educators using Open University OER on OpenLearn and iTunes U (Table 4). **Publication 8 (Law, P., 2016a)** delves deeper in to the data to provide a more detailed analysis of the demographics of OpenLearn learners in particular in terms of disability, educational achievement and employment status. It describes how the refinement of OER to reward digital badges may suit those most seeking to use OER to improve employment prospects, or those who were simply unable to afford formal education; two significant groups identified as users of OER. **Publication 6** discusses that “a substantial number of informal learners using the OU’s free content do so for work and/or professional development reasons – a factor that greatly influenced the employability-related aspects of the university’s badging pilots.” (p.157)

Table 4 Informal learners, formal learners and educators using iTunes U and OpenLearn (adapted from Law et al., 2015)

	iTunes U	OpenLearn
Informal learners	42%	48%
Formal learners	38%	33%
Educators	20%	16%

Both learner and educator	18%	23%
Employed	66%	58%
[Motivated by] relevance to work	22%	31%

However it is **Publication 3** that is of most widespread importance since it discusses the results of the first ever large-scale study of learners on OpenLearn and iTunes U undertaken specifically to analyse demographics and motivations for learning. This is set within the context of changes in access to technology, particularly mobile devices.

The main question raised by **Publication 3** was “what are the demographic profiles of those accessing OERs and their motivations for doing so?”. One way to investigate such a question is by using platforms that support very large numbers of learners accessing free educational content e.g. the OpenLearn platform and iTunes U. The key differences in the demographics of learners across these platforms is revealed in **Publication 3** is summarised below:

- **OpenLearn** users are predominantly located in the UK; compared to iTunes U users, they are slightly older, more fill the categories of unwaged and retired and more are declaring a disability. In addition, OU data (January to July 2013) shows that 82% are visiting OpenLearn via a desktop or laptop computer and 18% via a mobile device.
- **iTunes U** users are predominantly outside the UK and US. They are slightly younger than OpenLearn users, the majority are employed, and fewer are disabled (the prevalence of disability rises with age). Internal OU data (January to April 2013) shows that 85% are connecting to OU content on iTunes U via mobile devices. (pp.208-209)

In a broad assessment of the demographics of learners using the platforms, the paper also revealed the motivations of disabled learners, educators, informal learners and formal students and illustrated that across both platforms there is a “higher representation in two of the widening participation groups using free content via iTunes U and OpenLearn” than the population as a whole (p.216); those groups being a) disabled and b) living in a predominantly English speaking country without English as

a first language. Based on this demographic analysis revealing a broad spectrum of users in widening participation groups, **Publication 3** goes on to make a recommendation to the providers of OER to ensure that free educational content is as accessible as possible to improve widening participation and that provision is mobile phone-enabled. It concludes that OER providers should “syndicate their open content over multiple platforms, in multiple formats, in recognition that different platforms serve different populations with different needs; informal learners using free educational content want different subjects because their needs are different and they are from a range of demographic groups.” (p.218.) In addition, they should “optimise for a mobile population, that is internationally spread, who use a range of tools to study informally.” (p.218)

Further, **Publication 3** was the first of the publications in this thesis that sought to reveal the varied demographics of learners using OER and within that, OER that had been adapted by an educational institution for multiple platforms. It was the first paper in OER literature more widely to make a platform comparison of institutionally-delivered OER at scale in terms of its users. In looking at the issues of OER preparation (the challenge of technology and access) it revealed differences across platforms in terms of demographics and within demographic groups, differences in motivation for use. It concluded that there was much more that could be asked of informal learners using OER in order to gain a more in-depth understanding of the outcomes of their learning, their desires and issues with OER.

Hence, following on from this, the first large-scale analysis by survey undertaken in 2013 that was reported in **Publications 3** and **4**, was repeated in 2014 with additional survey questions to understand more about OER learner motivation in the area of recognition for learning via OER. These additional findings were presented in **Publication 8** which foregrounded the importance of supporting the motivations of informal learners using OER. The publication provides conclusions and recommendations reported internally by the author from the 2013 and 2014 studies, based on the analysis of survey data, which include:

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- Students that use free learning content during formal paid-for study declare improved performance and self-reliance.
- University-provided OER acts as a taster to those considering paid-for, formal learning.
- Work was needed to improve the usability of OpenLearn as an open course environment.
- The provision of digital badges enhances learners' motivation to complete an online course.
- [Badged Open Courses on OpenLearn] attracted learners who were more inclined to take up formal study. These learners appeared to be key to meeting the OU's widening participation agenda inasmuch as there were significant variations in relation to existing educational qualifications, the numbers of retired learners and numbers of learners reporting a disability compared to the OpenLearn demographic overall. (p.4)

and

- [The recommendation to] Create an entire [Badged Open Course] BOC curriculum targeting access students. (p.5)

Again, drawing on data collected from surveys on OpenLearn and in order to understand the motivations of formal learners using OER, **Publication 7 (Law, 2015)** reports an increase from 2013 to 2014 in positive perception of the impact of OER on learners' studies. It revealed that over a two-year period, formal learners using OpenLearn, had reported, across all response options provided in the survey:

- Increased participation in class discussions
- Increased interest in the subjects taught
- Increased satisfaction with the learning experience
- Improvement in grades
- Gaining in confidence
- Increased independence and self-reliance
- Increased engagement with lesson content

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- Increased experimentation with new ways of learning
- Increased collaboration with peers
- Increased enthusiasm for future study
- New interest in a wider range of subjects
- New interest in a wider range of subjects

The possible interpretations for this data were presented in the same publication as:

- Learners may be becoming more skilled at self-directed learning with OER.
- The increased cost of paid-for higher education may be leading formal students to more determinedly seek out support for their studies through OER, to increase their chances of success.
- With the continued and ever-more systematic release of content from the OU's paid-for curriculum into OpenLearn there may now be more parity between the OpenLearn content and the content of OU modules, with the content being increasingly up-to-date.
- Educators may be getting more skilled at using OER in their teaching and/or directing learners to OER for self-study. (p. 303)

The findings presented in **Publications 3, 4, 6, 7 and 8** were new to the field and revealed a then unique picture of the varied users of OER, their motivations and perceived impact of use. The OpenLearn platform was not then part of a study (similar those reported in **Publications 1 and 2**) that had a target audience and project-specific objectives to be achieved within a time frame. Given their very broad reach, research on OpenLearn and iTunes U reported in publications against this theme, are of relevance to other institutions releasing OER because they reveal a significant difference between the two platforms and hence highlight the very varied demographics of those engaging with OER. These publications however, whilst acknowledging the growing body of work to examine uptake of MOOCs at the time, did not set out to directly compare demographics between these course and platform types.

Comparisons with MOOCs

Whilst **Publication 7** briefly refers to comparisons with MOOC platforms in terms of differences in learner demographics, the author did not relate nor compare what is published around the relevance or otherwise of the completion rates of MOOCs that was widely discussed in the literature at that time (DeBoer et al., 2014; Ho et al., 2014; Koller et al., 2013; Reich, 2014; Stober, 2015; White, 2014; and Zhenghao et al., 2015) to the completion rates of OpenLearn courses and BOCs. It is important to this thesis to explain that this wasn't an omission or the part of ignorance, but a recognition that the modes of delivery of OER and MOOCs differed greatly at time of writing, including the recognition of the desires of MOOC providers to sell certificates to learners.

Further, whilst comparative (internal FutureLearn) data is available, the relationship between high and low self-regulation in learning, motivation and goal-orientation was not an objective of BOC analysis. Littlejohn et al. (2016) note that the "... difference in motivation and goal-orientation between high and low self-regulators" (p.44) is upheld in the literature and that Zimmerman (2000) poses that high self-regulators are more likely to be goal-orientated. Littlejohn et al. (2016) go on to say that "Learners who believed their learning to be interesting and important are more cognitively engaged than those learners who are motivated by grades" (p.44). This is relevant to the study of BOCs in particular, where the goal is the digital badge and the subject matter is largely skills development. The key observation by the author in the research and development of OER was not the level of self-regulation nor cognitive engagement, but their high business and social impact in terms of confidence-building, the lower socio-economic status of the informal learners taking the BOCs compared to OpenLearn overall and the high numbers of those making enquiries to become a formal student.

Internal data show that whilst the Open University's FutureLearn MOOCs that are adapted for OpenLearn to run with no start or finish date, tutor nor social group, have higher completion rates and higher click-throughs to make a formal enquiry than the same course hosted on FutureLearn in a closed, tutored environment, completion and non-completion are not a measure of likelihood to make

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a formal enquiry. Indeed, the experience of OpenLearn supports the Littlejohn et al. (2016) view that completion and non-completion are not a measure of quality of learning nor success, where success for OER on OpenLearn is broadly outreach and business impact i.e. learners going on to make an enquiry about formal study.

Recognition for informal learning

The Council of Europe (1997) describes **recognition** in formal education as the acknowledgement of another's educational qualification. Witthaus et al. (2016) note that the term **recognition** in the context of higher education in particular is used more often than **validation**, although both confirm learning outcomes against specific standards and proof of learning that can be exchanged into future learning or work. They further break down **recognition** into two separate processes: credentialisation of achievements; and recognition by the same institution that awarded the credentials, a different institution or an employer.

The OECD report of 2007 discussed in Chapter 2 was forward thinking in terms of the potential impact of the continued growth of OER and its relationship to the recognition of learning:

“OER can be expected to affect curriculum, pedagogy and assessment. With thousands of opencourseware courses from internationally well reputed higher education institutions available for free, teachers will need to consider that students compare their curriculum with others. Anecdotal data suggest that this is already happening. Concerning pedagogy, the role of the teacher is already changing from being the “sage on the stage to the guide at the side”. OER is likely to accelerate this process since the role of the teacher as a supplier of teaching material and the only guide to knowledge is also diminishing. As regards assessment, the increase in non-formal and informal learning will probably enhance the demand for assessment and **recognition** of competence gained outside formal learning settings. “ (p.125)

Casilli & Knight (2012) had identified early on how the digital form of a badge could find a home beyond gaming to be issued by organisations or individuals to recognise an accomplishment. Hickey

(2012) applied this to their potential in a learning assessment setting as a possible means to recognise assessment of learning (summative), for learning (formative) and as learning (transformative).

Effort currently being focused by learning technologists in HEIs into the provision of digital badging for formal learners and the speculation about its potential impact in the sector, has been published and is noted in Chapter 2. However, research has not addressed the impact digital badging is having on informal and non-formal learners who's motivations for learning vary greatly. Equally, while there is much literature on the growing impact of OER, its scale and many forms, studies rarely take into account the needs and motivations of particular outreach groups beyond the case study approach.

In addressing these gaps in the literature, the main question raised by **Publication 6** was "can digital badging address the needs and motivations of outreach groups using OER?". Building on opportunities for recognition of informal learning and an increasing interest in digital badges, **Publication 6** reports on the process and evaluation of the further repurposing of the original courses developed as OER for the B2S project. Based on what had been revealed in previous publications by the author, these same courses were further embellished in 2015-16 for OpenLearn with new assessments and the application of an OU-branded digital badge upon passing assessments. Badges and a Statement of Participation (downloadable PDF certificate) were issued automatically following the completion of the course and a 50% or higher pass of a series of online quizzes. **Publication 6** neatly bridges the first two themes of this study in that it discusses the further refinement of the repurposed B2S OER courses to "enhance learner confidence and progression" (p.153) to support the growing body of knowledge around the motivations of informal learners. This was undertaken at a time when recognition for completing a MOOC was largely via a learner paying for a certificate, versus branded recognition for free. The badged courses were evaluated as pilots which involved a review of learner demographics, their completion rates and qualitative data regarding motivations for study using the same metrics originally applied to evaluating the OpenLearn population in order to provide comparative data.

As a result, **Publication 6** reports “significant variations in relation to prior education, numbers of retired learners and numbers of learners reporting a disability compared to OpenLearn users overall.” (p.158).

Charleer et al.’s (2013) description of the application of digital badges to learning as “an abstraction of tracked data” (p. 194) that provide a means to motivate, provide feedback and be socially shareable, is most closely aligned with their application through the OpenLearn platform described initially in **Publication 6**, and further in **Publications 7** and **8**.

Publication 8 discusses this recognition for informal learning and draws on the conclusions made in **Publication 3** by reference to the authors’ growing body of knowledge about the motivations of informal learners using OER. Whilst **Publications 6, 7** and **8** reveal a unique approach of repurposing formal learning delivered as OER that incorporates open, digital badging to recognise informal learning achievements, **Publication 8** establishes this publicly as a business-as-usual activity with broad and positive implications for the sector and the OER community.

Publication 10 in particular bridges Themes 2 and 3 of this study, presenting more in-depth analysis of OU badge earners, the impact of recognising open learning achievements and the ongoing role of digital badges as an accepted and key component of the business of OER. It describes research into the first six BOCs on OpenLearn and their impact during an initial 8-month period. In particular, it reviews the demographic relationship between learners choosing to earn a digital badge from the OU and the OpenLearn population as a whole, updating data initially reported about the pilots in **Publication 6** i.e. that BOC learners are younger and less well qualified, and reports on the subsequent impact of these findings on institutional open educational practice.

The paper discusses a follow-up study with survey respondents who had declared they would be showing their BOC achievements with an employer, having earned the recognition from the OU. This data showed that:

- 75% felt their employer valued the BOC that they had taken.

- 80% of those who had not shared their achievement still planned to do so.
- 98% felt the BOC had a positive impact on their work.

(p.147)

This early activity to explore the attitudes towards digital badging by badge earners and their employers, was the first of its kind and was shared widely in open badging networks by the author and related publications well cited (see Chapter 4). Questions remain as to the future integrity of open badging if not recognised or valued by employers and this remains an emerging area in the literature in support of this theme.

Contribution to the field within Theme 2

Following the first two pilot BOCs on OpenLearn, research of the impact of the next six courses to be developed as OER for OpenLearn was first presented in **Publication 7**. The main question raised by **Publication 7** was “what are the demographic profiles and motivations of those accessing BOCs against those accessing non-assessed OERs?” This study provided a larger and more extensive data set with which to compare demographic data across OpenLearn overall with the BOC learners in particular, reporting key differences between course subjects, in some areas significantly, such as highest educational qualification and disability status. The paper seeks to reveal the motivation and impact of informal learning on both formal and informal learners alike, highlighting that BOC learners bring another new demographic to OpenLearn as a distinct group of OER learners. In doing so, **Publication 7** spans the three themes of this thesis in that it:

1. Compares the experience and cost of repurposing and redeveloping formal learning to writing from scratch for use as OER and the challenges raised by OER. [Theme 1]
2. Discusses the successful application of digital badges and formative assessments in OER to motivate informal learners, in an otherwise un-tutored environment, and to prepare learners for study. [Theme 2]

3. Reveals the high impact of BOCs in terms of new student enquiries. The paper discusses how well liked the various embellishments to the courses were, the relevance of which was carried through to **Publication 9** in reference to the refinement of OER taken forward in open educational practice for maximum business and social impact. [Theme 3]

Publication 8 makes a contribution to the literature in providing a tangible application of a recognition for learning digitally in an informal setting. It first describes the application of digital badges to OER specifically as **recognition for informal learning**. For open badges on OpenLearn in particular, the recognition is not validated beyond a user log-in and trust statement but confirms learning outcomes and the trust of association through a digital profile. Whilst this builds on work at the time by Miligan et al. (2014) who describe the use of social networking tools by learners to share their achievements, the paper highlights the particular aspirations of providing a suite of badged courses to respond to the motivations of learners using OER identified by the author at a time of increasing access to Internet technology and OER, and tools for sharing activities and achievements. It concludes that: "We have moved from Cross' anonymous world [of informal learning] to one of **identified informal learning**... there is a growing demand and expectation that informal learners want recognition for their achievements and engagement that can be acknowledged beyond a closed forum of learners." (p.12)

Publication 8 makes a further contribution to the literature by revealing in more depth the motivations of disabled informal learners, learners' problems with OER usability more generally, and critically, the desire for certification of OER study against the prohibitive costs of studying in higher education.

By supporting and recognising those interacting with informal learning provision, and through the empirical analysis of this work, there is also a contribution to the field in terms of refining and shaping definitions of informal and non-formal learning. As discussed in Chapter 2, theorists have defined informal, non-formal and formal learning according to context (educational, work-based or incidental gaining of knowledge). Livingstone's (2006) organising principle for these definitions is the educator

with non-formal learning being teacher-led and adhering to a structured curriculum albeit followed voluntarily. **Publication 9**, in prefacing the review of delivering OER for 10 years via OpenLearn, adds another contribution to definitions of non-formal learning through the identification of those learners using informal learning resources, who have chosen to enrol on a free course and study in a self-directed manner. OpenLearn does impose a curricula of sorts, in that The Open University releases 5% of its taught modules for free onto OpenLearn, but this free provision is not directly teacher-led. The publication makes a case for the provision of informal learning for intentional use, but given its scale and variety of types of learning provision (60 seconds to 60 hours) affords a range of interactions and intentions for its learners. In this context, those seeking recognition for their engagement with OER through the achievement of a digital badge in particular, exemplify this addition to the definition of non-formal learning.

Further, the trust in digital badges as a new technology and therefore the degree to which they can be accepted in association with educational achievement is reflected in the literature (Herron, 2012; Hickey & Willis, 2015; and Ifenthaler et al., 2016). Micro-credentialling overall is an emerging space where practitioners and theorists have viewed its development as an opportunity to serve the challenges of modern education in a digital world (Ellis et al., 2016; Lockley et al., 2016). Whilst others had noted the potential for digital badges in education more generally (Charleer et al., 2013; Gibson et al., 2013; Wu et al., 2015; and McDaniel & Fanfarelli, 2015) it was clear that there were no policies implemented, pilot or otherwise, on the use of digital badges in education at this time (Bixler & Lang, 2015). Whilst Phelan (2012) was the first to associate a *potential* model for digital badge use as being a form of certification in particular for informal learning, there were no case studies in the literature discussing this application nor impact.

Case studies have reflected the use of digital badges over a range of educational sectors (Gibson et al., 2013; O'Byrne et al., 2015) and for the purposes of providing a means to recognise skills to improve employability (Diamond & Gonzalez, 2016; Gamrat, et al., 2014; Leaser, 2017). Case studies have not addressed their use within an OER context, nor their ability to serve multiple learner groups for

multiple purposes. **Publications 6, 7, 8, 9 and 10 have demonstrated the use of digital badges as a motivational tool for informal and formal learners alike across educational sectors and as a means for assessing, motivating and recognising a commitment to free learning.** In particular, the work that **Publication 3** discusses was not only the first to reveal the potential for the application of digital badges in education as an outreach activity for educational institutions, but is also the first to propose bringing the worlds of OER and open badging together in support of a business model for OER.

Theme 3: Delivering an institutional business model for OER

The final theme of this study explores the refinement of OER as an institutional activity and the platforms and systems that support it. The endeavour to make OER impactful for both social and business mission is not unique in the global OER movement but as an ongoing, centrally-managed endeavour, publications in this thesis have shown that agile course development, research and refinement can bring about both social and business benefits to institutions. Publications discussed in this final theme view the refinement of OER through the lens of platform and course delivery development and the particular application of open digital badging to OER. **Publication 11** is a capstone to this study in that it elaborates on established theories about the multiple functions of OER – particularly as a business model – discussed earlier in **Publication 4 (Perryman et al., 2013)**, and updates the field with new evidence relating to the sustainability of OER as a “viable business model for universities, and a much more effective form of marketing than most other media” (de los Arcos et al., 2014, p.7). **Publication 11** follows up on the themes of **Publication 4** and **Publication 8**, bringing new data and insight into the original claims that OpenLearn was functioning as a taster for formal study, as a showcase of the OU’s formal learning content, as a means to accelerate learning and as a form of altruism. In comparing data over three consecutive years, the publication provides statistical and qualitative data gathered from surveys that show an increase in evidence to support updated theories about these functions in the context of a changing higher education landscape, increased tuition fees and access to technology.

Publication 11 also reports on the perception by formal learners of an increasingly positive impact to them of using OER alongside their studies, shown in time through comparisons of 2013, 2014 and 2105 OpenLearn survey data.

A business model for OER

With the development of MOOC platforms – as an off-shoot of OER – came a variety of business models whose purpose was to make money from online learning. The initial sales pitch was to offer certificates for a fee branded by large US universities. These efforts, which have still required the investment of hundreds of millions of US dollars, continue to adapt and respond to the most effective means of making profit from free learning. From the perspective of OER as a business case, Daniel (2012) in particular singles out MOOCs as being an example of the “laudable desire... to make knowledge the common property of humankind, and to find a business model that generates money for doing it” (p.13).

Some MOOC platforms, such as Udacity, now tailor their offering to so-called ‘nano-degrees’ whereby learners do not study for free, but instead at a cost of \$200/month for a year learners can obtain professional recognition in a subject area required by a specific industry, for example, telecommunications. Whilst Coursera still offer access to courses for free, any recognition for learning comes at a price of around \$59 for a certificate. The refinement isn’t so much of the educational resources themselves, but in the business model and associated links to part of a formal qualification and/or validation by an educational institution.

In an overall commentary on Udacity and other MOOCs providers, Mitra (2016) notes “The problem with the MOOC segment is astronomical amounts of funding has so far resulted in relatively low monetization. How investors will make money remains a looming question.”

Daniel (2012) and de Langen (2013) discuss the move from openness due to changes in political landscape and a reduction in external funding for OER initiatives, looking beyond the altruistic motivation for OER expressed by the OECD (2007). Whilst this assessment is summarised in

Publication 4, Daniel also goes on to say that “...The business case for OER is developing nicely... However, the search is still on for reliable ways of making money out of xMOOCs, especially for the universities involved. It is unfortunate that Koller et al (2013) justifies xMOOCs in a particularly inept way by claiming that they are the answer to increasing access to higher education in developing countries.” (p.13). In referring to Daphne Koller he is referring to the Coursera MOOC platform and claims made that MOOCs are reaching the underserved. It is now widely accepted that MOOC platforms serve the already well qualified, a point made in **Publication 6** when comparing them to the demographic of OpenLearn learners.

Publication 4 is important in that it demonstrates how OpenLearn tangibly supports a business case for OER and sets the constructs for the benefits of OER against a case study – in the form of OpenLearn – that provides institutionally-developed OER at scale, a theme returned to in **Publication 11**. By meeting some of the challenges raised by OER outlined in **Publication 2**, and by examining OpenLearn survey data, **Publication 4** reveals that OpenLearn supports the business case proposition for OER in the following ways:

1. As a ‘taster’ for formal study.
2. As a ‘showcase’ for the formal taught curriculum provided by the OU.
3. As a means for ‘accelerating learning’ for formal students using the platform.
4. As a means to understand the barriers to using OER.

The recommendations of the paper focus on the relevance of supporting a business model for OER at a time of increased tuition fees and hence rising barriers to formal education. In support of this, it highlights how a business model can be enhanced by integrating innovative pedagogies, such as the use of digital badging, or better links with social media allow, respectively, reward for study and easier sharing of materials. The recommendations conclude with suggestions for future innovations to further support a business model, such as charging for enhanced provision e.g. tutor feedback. The paper obliquely references the challenges of OER raised in **Publication 2** through practical

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recommendations and makes a contribution to the field by drawing on theories around the benefits of OER as a business model and applying them to a large-scale institutional endeavour.

Publication 11 brings these constructs about OER as a business proposition up to date by comparing data from the 2013, 2014 and 2015 OpenLearn surveys and setting them in the context of the rising costs of UK university fees. It highlights the 19-25% increase in students declaring a reliance on using OpenLearn resources to try out university-level study before signing up to a fee-bearing qualification. The paper notes “At the time the 2013 OpenLearn survey was conducted, the full impact of these [fee] changes was only just beginning to be felt” (p. 15).

Publication 4 and **Publication 11** discuss the potential of OER to support formal student retention based on findings that formal learners report increasing confidence, independence and better study skills after using OpenLearn. **Publication 11** discusses this important factor when set against the Higher Education Academy’s (Thomas, 2012) prediction that higher fees may lead to a negative impact on retention. **Publication 9** provides empirical data to support Thomas’ suggestion revealing results of a survey of formal OU students’ motivations for using OpenLearn. Of the 1,127 student respondents who had used OpenLearn, 48% declared increased confidence in their studies as a result of using the platform. Data also showed that OU students using OpenLearn were 5% more likely to pass their current module and progress to the next, than those who did not. Further, the paper also reports the authors’ findings that OpenLearn supports a business model for OER through the qualitative data gathered, in that students are using the platform to “see what study at the OU is like before making a commitment” and to “choose the right module through the provision of taster courses” (p. 147).

The refinement of OER in practice

Publication 5 (Law & Perryman, 2015) reflects on the data gathered by the author in **Publications 3** and **4**, the subsequent refinement of open educational practice, the piloting of new digital innovations and the ability, through OpenLearn, to gather rapid feedback on these new approaches. In essence, because of the perpetually open approach to open course delivery on OpenLearn and the

opportunities to review data analytics with large numbers of learners, it is possible to experiment and refine in comparatively shorter timescales than seen in formal, closed, learning environments with far longer production cycles e.g. the development of a course textbook. By contextualising OpenLearn qualitative data against a) data analytics e.g. such as common search terms used within the site and b) the impact of MOOCs more generally i.e. the growing expectation of being able to find free courses online, the ability to rapidly respond to learners' needs becomes critical to the endeavour of ensuring a robust business case and outreach function for OER.

Publication 9 also reflects on OpenLearn being a “test bed for innovation in elearning” with a complementary outcome for the business mission of OER. It reports that as a result of data gathered on the impact of OpenLearn, OER practice would fundamentally change at the University through direct engagement with “pedagogical features that boost confidence, learning and course engagement in an open, unsupported environment” (p. 147); a change from a previously passive approach to the replication of sample module content released as OER.

Publication 10 also reveals the institutional response to disabled learners on OpenLearn requesting to have content in multiple formats, that is, to issue all OpenLearn courses in ebook, PDF and Word formats, amongst others. **Publication 11** refers to the 10% of OpenLearn learners who live in developing countries and how comments by these learners in the 2014 OpenLearn survey called for downloadable content that can be used when internet access is poor. This direct action to meet these learners' needs, whilst coming at a financial cost, enabled the OU to heavily syndicate OU-branded free learning to new third-party platforms, such as Amazon for Kindle, and hence reach wider audiences. This provision of multiple formats of OER is touched on in **Publication 9** as a means of supporting reuse of OER by educators and then termed in **Publication 10** as **open syndication**: “the activity of disaggregating a course for its parts to maximize the use of assets” further arguing that “from the perspective of the University's commitment to free learning and outreach, the BOC project represents a coming together of several strands of openness in order to maximize the social and

business mission of providing open learning.” (p.153). This embracing of principles and values of openness in education (Zijdemans Boudreau, 2014; and Mishra, 2012) through the development and deployment of BOCs on OpenLearn is explained graphically in Figure 3.

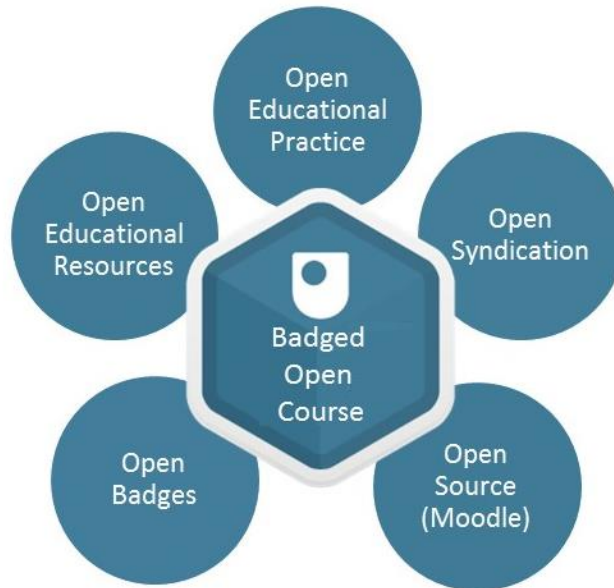


Figure 3. How Badged open courses demonstrate an integration of open principles (Law, 2016b)

In summary, the papers presented in this study and the activities that have resulted from research into learner needs, show that OpenLearn as a business function:

- Acts as a taster for formal study
- Acts as a showcase for the taught (paid-for) undergraduate and postgraduate curriculum
- Acts as a means to accelerate learning
- Provides access to researchers to understand the barriers to using OER
- Supports student retention and progression
- Equips Open University students with more confidence, independence and better study skills
- Supports the needs of disabled learners and learners in developing countries through the delivery of alternative, downloadable formats of free courses
- Embraces the principles of openness and supports open educational practice

Aside the direct action of an OpenLearn learner clicking through to the OU's online prospectus to become a formal student – an activity measured through computer-based data analytics – these functions of OpenLearn that support a business model were at best, only ever internally theorised at the OU. The publications reported in this thesis accompanied internal reports and recommendations which have provided a clearer and more nuanced understanding of the contribution OpenLearn and associated syndicated OER make to strategies underlying the delivery of free learning, and directly influenced changes in commissioning and budget application during the period reported in this study.

Contribution to the field within Theme 3

Publications 5, 10 and 11 have provided a contribution to the field of the changing role of OER. The papers provide a review of how the activities and modifications to OER in response to regular research, a modification to practice and refinement of OER has enabled a rapid and impactful response to the needs of OpenLearn learners. This research at scale can be viewed over time against a backdrop of:

- an increase in access to the Internet,
- the increased availability and diversity of portable phones and computers, and
- the increased cost of higher education.

From a business perspective, strategic policy recommendations from studies reported in **Publications 10 and 11**, particularly through the deployment of free open badges and certification, have led to greater impact to the University in terms of more learners being motivated and inspired to become formal students coupled with the evidence that Open University students using OpenLearn are more likely to be retained. This is a theme echoed by Weller et al. (2017) in his summary of the work of the OER Research Hub: “the sustainability model for OER may be one that can be couched in terms of recruitment and retention (compared with the sale of additional services as seen with MOOCs)”. (p.75)

Publication 10 makes a contribution to the field by expressing the notion (coined by the author) of **open syndication**: the means by which OER can be syndicated to multiple platforms for use on a

variety of desk or handheld devices and hence to reach wider audiences. It is a practical development for OER for both altruism and business model that is easily replicable by other educational institutions committed to delivering OER.

The hypothesis examined by the OER Research Hub in relation to business model of OER is stated as “OER adoption at an institutional level leads to financial benefits for students and/or institutions.” (de los Arcos et al., 2014, p.23). In particular, the OER Research Hub’s final report focuses on savings brought about by the increasing use of university textbooks being collated and published as online OER stating: “There is strong evidence for savings with Open Textbooks that are used to replace compulsory set texts. The evidence for cost savings of other forms of OER is less clear. Often it is difficult for educators to know whether their institution saves money, and what happens to any such savings.” (pp. 29-30) These OER textbooks may be less costly to compile, but more importantly, represent a saving to the student, a problem which ostensibly faces university students outside of the UK. The OU, and UK HEIs in general, do not have the same scale of problem of expensive textbooks as is seen in the US, and hence OER research around evidence for an OER business model has been dominated by this recent development (Bliss et al., 2013; Hilton and Wiley, 2011). Butcher & Hoosen (2012) also note the tangible impact that OER are having on the availability of free university textbooks where there has historically been an additional and compulsory expense to US undergraduates to purchase paid-for textbooks, noting comparable situations in Brazil and South Africa.

The OU may not be unique in the scale in which it delivers OER, but the specific mechanism by which it can generate income from OER because it is a distance education provider and an open university, does not, unfortunately, provide many opportunities for comparison.

Whilst de los Arcos et al. (2014) state that OER can provide “a viable business model for universities, and a much more effective form of marketing than most other media” (p.29), the literature overall provides little data that demonstrate where this is taking place. Indeed, as noted in **Publications 4** and **11**, much was discussed about the business model for OER but no studies examined it as a working

practice. By providing data and recommendations particularly in **Publication 9**, on student retention, progression, and recruitment, the work of the author around a business model for OER makes a significant contribution to the field.

Further, BOCs at the Open University have and do provide learners with information about the quality of the provider (supplied implicitly through the Open University brand) whilst at the same time contributing to learners' motivation to both complete a free course of study and be confident enough to make their first enquiry about becoming a formal student. This element of the use of digital badging is not discussed in the literature and may be unique to the application of digital badges by the Open University in its informal OER offering.

However, as an implication for open education per se, papers presented in this study make a significant contribution by providing data analytics, quantitative and qualitative data that justifies the approach taken that has moved from a pilot endeavour to a business as usual activity. **Publication 10** summarises this by arguing that "the issuing of an open digital badge (or overarching, recognition for informal learning) for free may become an important element in the pursuit of open principles in education." (p.154). The work uniquely describes the relationship between OER and digital badging at the OU as one that is replicable at scale in pursuit of social and business objectives and "a new opportunity for those developing quality-assured OERs, open badges and practices to offer an alternative route into formal education" (p.156).

[Interrelationship between the papers: a summary](#)

This chapter has discussed the work described in the publications, building on literature defining informal learning, its interpretation through OER and the application of digital badging to such endeavours. The thesis has a strong resonance with the emerging OER discipline and strongly supports the scholarship of teaching and learning given that it has informed policy and practice at an institutional level at the Open University, as noted in this chapter. The publications discussed in this chapter have provided a journey through a process of research, discovery and the subsequent

refinement of practice to impact learner and institution alike. Perhaps what is missing from the formality of their presentation is the joy associated with this discovery and the potential for further work in shaping university and sector strategy in this area.

My literature review started with the varying definitions of informal and non-formal learning and how these have changed over time. Literature had not fully addressed the impact of technology on these definitions shown through widespread uptake, although some had discussed the relationship of learning with OER (Downes, 2006; OECD, 2007). The work in this study makes a contribution to discussions and emerging strategy around Recognition of Prior Learning (RPL) and Accreditation of Prior Experiential Learning (APEL) by providing recognition for informal learning achievements through digital badging. It provides a sharper and more colourful lens through which to regard definitions of informal and non-formal learning and the changing needs and expectations of learners accessing free learning. It highlights that more work is needed to connect the real acquisition of micro-credentials with a journey to formal learning and employability, a subject I return to in Chapter 5.

Theme 1 highlights the challenges to institutions of the refinement of OER but overall, the benefits to learners, with **Publication 2** in particular establishing the breadth of challenges that the refinement and delivery process of OER bring about.

Theme 2 explores the changing motivations of informal learners using OER and how the publications have addressed some of the challenges of OER in a rapid commissioning environment. Resource implications for refinement are noted and are set against exciting possibilities for the future in terms of the application of digital badges to reward both formal learners and informal learners alike.

Theme 3 highlights my contribution to the discussion around the business benefits of OER, how this sits comfortably with altruism and remains, perhaps temporarily, out of sync with MOOC provision. Whilst there are strong arguments supporting the case for OER, recent case studies have focused largely on the rise of textbooks as OER. Digital badging in education remains an under-researched

area, which is unsurprising given its recent emergence; its potential for growth in the area of supporting employability is discussed in Chapter 5.

The themes described in this chapter have framed the interrelationship between the papers in this body of work. Where Chapter 2 highlighted gaps in the literature around knowing who was using OER and why, and for digital badging, their validity as a means to recognise informal learning, Chapter 3 has revealed important data and associated refinement of OER and the potential value of digital badges in education. Where the literature lacked examples of large-scale studies of OER and its impact as a business model in education, the publications presented in this chapter provide a comprehensive review of one such wide-reaching OER provision, highlighting the need for others.

This concludes this chapter showing the interconnection between papers thematically and theoretically. Chapter 4 now reviews the publications in chronological order, providing a more personal context in which they were written and their reception since publication including citations and comments by reviewers.

Chapter 4. The publications

This chapter reviews the publications for this thesis in chronological order, the context in which they were written and their reception since publication. It provides a more personal context in which they were written and includes citations and comments by reviewers. The chapter also includes the relationship of the papers to the themes and my contribution to each (Table 5) and awards won by the author for work described in this thesis (Table 6).

Publication 1

Law, P., McAndrew, P., Law, A., Warner, K., Runyon, J., Lascu, D. & Muramatsu, B. (2012). A Bridge to Success. In *Proceedings of OCWC 2012: Innovation and Impact Openly Collaborating to Enhance Education*. Cambridge, UK.

Summary of Publication 1

This publication was written towards the close of the Bridge to Success project (a US-UK collaboration to repurpose formal introductory-level curriculum as OER) and was submitted as a paper and presentation at the OER12 conference. At that time, much of the practical effort of repurposing and delivering the OER had taken place, but a full evaluation of the impact on student success was yet to be completed.

As noted in Chapter 3, the publication describes course repurposing as a means to create OER as preparation for study. The project was funded by a grant from the Bill and Melinda Gates Foundation, and included the practical activity of repurposing two of the Open University's 10-point 'Access' courses for use specifically by US colleges. The courses were to be made available for free and were to act as preparatory material for underserved groups entering the US college system.

The publication examines a real example of repurposing content for release as OER and the challenges that this presented. The courses were embellished with additional online activities and formative assessment exercises, with the expectation that funding would be sought later to develop them to issue digital badges. The second iteration of the Bridge to Success courses was to badge them for

OpenLearn and evaluate the impact of the badge as a motivational tool, an activity discussed in **Publication 5**.

My involvement in the project marks the beginning of my interest in researching learner motivations in an open environment and the challenges of refining OER for use online. My role as a learning technologist, was to lead the joint US-UK teams to redevelop, modify and publish the projects' courses. Whilst the Bridge to Success courses were specially adapted for use without classroom tuition, some were delivered in classroom settings and a suite of professional development tools (webinars) were delivered for staff at adopting US institutions about open educational practice and the potential benefits of OER for at-risk students.

The publication's conclusion describes the positive experience of a collaborative OER project, the rapid uptake of the pilot courses and next steps to evaluate impact. It was the first project to use OERs in key subject areas to target at-risk students across a range of institutions.

Citations and reception of Publication 1

Excluding self-citation, there are no citations for this publication, however, the paper has been downloaded 447 times from the Open University's public Open Resources Online (ORO) publication and research-output repository (ORO, 2017).

Publication 2

McAndrew, P., Farrow, R., Law, P., & Elliot-Cirigottis, G. (2012). Learning the Lessons of Openness. In *Journal of Interactive Media in Education. Special Issue OER 2012, Cambridge*. Edited by Comas-Quinn, A., Fitzgerald, A., & Fairweather, I.

Also published by Farrow, R. as: **McAndrew, P., Farrow, R., Law, P. & Elliott-Cirigottis, G. (2012). Learning the Lessons of Openness. *Journal of Interactive Media in Education*, 2012(2), p.Art. 10.**

Summary of Publication 2

This publication was written in the final year of the Open Learning Network project (OLnet, 2016) for which I worked as a project and research manager. As a William and Flora Hewlett-funded international OER project, it was designed to aggregate OER resources, share and debate open educational practice experiences and provide recommendations for improving OER provision. The project funded OER research fellowships and ultimately greatly informed the approach taken for the bid to the same funder for the OER Research Hub project (The OER Research Hub, 2016).

As discussed in Chapter 3, the publication proposes 12 key challenges of OER, covering policy, assessment, practice, access and sustainability. It discusses Bridge to Success as an example of a project where many of the challenges of OER arise in practice, ostensibly around the preparation of materials, and discusses solutions sought by the project team. The publication notes weaknesses in the evidence base for the impact of OER on policy and practice and highlights the collective way in which the challenges identified in the paper, could be met.

Citations and reception of Publication 2

Excluding self-citation I am aware of 19 publications that cite **Publication 2**. In addition, it has been downloaded 787 times from ORO, has been viewed 217 times and downloaded 43 times from the *Journal for interactive Media in Education* website.

Citations

Pitt et al., 2013

Comeau & Cheng, 2013

McAndrew & Farrow, 2013

Atenas & Havemann, 2014

Littlejohn & Pegler 2014

Atenas, 2014

Fidalgo Blanco et al., 2014

Dalsgaard & Thestrup 2015

Atenas, 2015.

Ibáñez Bonilla, 2015

Constantino et al., 2015

Farrow et al., 2016

Nkuyubwatsi, 2016a

Nkuyubwatsi, 2016b

Nkuyubwatsi, 2016c

McGlinn, 2016

Saadatmand, 2016

Nkuyubwatsi, 2017

Nkuyubwatsi, 2018

As described below, citations for this publication indicate that it was influential in works that sought to emphasise the emerging aims and challenges of the OER movement particularly around uptake and policy.

Nkuyubwatsi (2016a, 2016b, 2016c, 2017 and 2018) cites this publication several times when discussing institutional adoption of open educational practice and culture, and access to OER, highlighting the potential contributing factors to slow uptake. Others have also chosen to highlight a perceived lack of institutional incentive and policy for open education to flourish, in order to raise awareness of barriers to the success of the OER movement (Constantino et al., 2015; Nkuyubwatsi, 2017; Atenas, 2014; and Ibáñez Bonilla, 2015).

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McGlinn (2016) cites this publication five times, drawing attention to the claims made regarding the benefits that OER brings in terms of increased use over the past decade, financial savings for students and improvements to the quality of teaching materials.

Other citations have used this publication to endorse the argument that OER need to be available in different languages and in a variety of formats in order to increase global uptake and equity for learners (Atenas, 2014; Atenas & Havermann, 2014; and Comeau & Cheng, 2013).

Further, Nkukubwatsi (2016c) uses this publication to argue for a mismatch between the views of stakeholders delivering policy institutionally and the needs of learners in comparing the perceived low uptake of OERs to the relatively high uptake of MOOCs.

Publication 3

Law, P., Perryman, L.A. & Law, A. (2013). Open educational resources for all? Comparing user motivations and characteristics across The Open University's iTunes U channel and OpenLearn platform. In *Open and Flexible Higher Education Conference 2013, 23-25 October 2013, Paris, European Association of Distance Teaching Universities (EADTU)*. 204–219.

Summary of Publication 3

This publication was presented as paper for the European Association of Distance Teaching Universities (EADTU) annual conference in Paris, 2013 and was published in the conference proceedings alongside **Publication 4**. It represented the first major study of the Open University's contribution of OER since McAndrew's report on OpenLearn in 2009 (McAndrew, 2009). The publication represents the output of my time as a Fellow of the OER Research Hub (The OER Research Hub, 2016) from 2012 to 2013. I was still working in IET at the time and approached the then Pro Vice Chancellor (Learning & Teaching) for permission to run the study. My aim was to examine the research question 'What are the motivations of learners using the Open University's OER on OpenLearn, iTunes U and YouTube?', research the key demographic profiles and motivations of those learners, and look

at the evidence for OER as a business model. It was my first foray into large-scale qualitative and quantitative data collection around OER use and revealed significant demographic and motivational differences between platform user groups. Leigh-Anne Perryman and I devised the questionnaire bank for the OER Research Hub and used this as a basis for many of the questions that mapped against the 11 hypotheses of the OER Research Hub (The OER Research Hub, 2016).

Publications 3 and **4**, and my final report for the fellowship served both as business data for the Open Media Unit (OMU) at the OU and research data for the Hewlett-funded project. I was recruited to a new role in the OMU at the time and took this work with me. It piqued my interest tremendously as it opened my eyes to possibilities of gathering large quantities of robust data from diverse and massive groups of learners using OpenLearn, iTunes U and YouTube, and was hence a radical departure from the relatively small case study data collected through Bridge to Success. The surveys linked from the three platforms were then repeated with modifications in 2014 and 2015 and internal reports delivered for all three years with recommendations.

Whilst I have tried to address the efficacy of OER beyond a case study approach by comparing impact of free learning on multiple platforms, it is the case that OpenLearn has dominated my work largely because it underpinned the context for my day-to-day professional role from this point in time and presented an opportunity to examine a large body of informal learners using OER. The dominance of the OpenLearn platform in the papers presented in this study begins with **Publication 3**. Given this scale and reach of the Open University's OER, it has been possible to reveal key data around outreach, including problems faced by disabled learners, those unable to afford to participate in higher education and those seeking improvement in employment through Open University-branded recognition for an informal learning commitment.

The Open University's channels on iTunes U and YouTube were launched in 2008 with a view to curate existing free learning material and publish it to new audiences. YouTube in particular hosted audio and video of material re-issued from formal taught modules and specially commissioned pieces that

reflected topics key to faculty priorities that may have mass appeal. iTunes U hosts ebooks and iTunes U courses (text and video assemblages) as well as all the audio and video hosted on the University's channel on YouTube and OpenLearn. Because much of the same material existed across all platforms, this also represented a unique opportunity for evaluation of a large-scale OER provider and educational institution that went beyond basic website data analytics.

Coupled with the opportunity for new insight into informal learners' motivations for study, was the potential for robust findings due to the potentially high number of responses. At the time that I undertook the research, it was known that:

- OpenLearn was receiving 5.5 million visitors a year, of which 13% were going on to make a formal enquiry at the Open University;
- YouTube was receiving around 4.5 million views of Open University content with a 0.13% click-through to make a formal enquiry at the Open University; and
- iTunes U was generating around 1.4 million downloads of Open University content a year with a 0.39% click-through to make a formal enquiry at the Open University.

It was through my research as an OER Research Hub Fellow that I chose to publish and present **Publications 3** and **4** based on the data from the OpenLearn and iTunes U surveys. As discussed in Chapter 3, the papers' findings were important: the key claim of **Publication 3** asserts that the various platforms (OpenLearn, iTunes U and YouTube) attract very different groups of learners to the same OER, with OpenLearn being the critical environment for delivering OER for outreach. There has not been a previous study of an institutions' OER across multiple platforms that had identified multiple learner groups to the same content until that point. As Weller et al. (2017) note "Beliefs regarding the benefits of OER were often stated in publications, including their ability to: radically reduce costs, deliver greater learning efficiency, promote continuous improvement of instruction and personalized learning, encourage translation and localization of content, and offer equal access to knowledge for

all. However, empirical data to evidence these beliefs was usually absent. This was the impetus for the founding of the OER Research Hub.” (p. 70).

The conclusion to **Publication 3** highlights the paper’s significance in terms of providing new insights into modern informal learning. The paper re-states the observed diverse demographic of OER users and varied motivations across different platforms, and queries whether institutional OER meets the needs of its users. Indeed, **Publications 3** and **4** were of critical importance institutionally and marked the end of platform-specific commissioning at the Open University, given the stark fact that the iTunes U audience in particular were already well served educationally and had little intention to make a formal enquiry to the Open University: it served neither business nor altruistic functions. To this day, new content that finds its way to the Open University channels on iTunes U, YouTube, Amazon and Google is a by-product of content developed for OpenLearn only, usually in the form of ebooks and videos. Whilst the publication robustly influenced business decisions regarding the provision of OER by the Open University, it also delivered insights into modern informal learning at a time of increasing and ubiquitous access to the internet and mobile devices.

Citations and reception of Publication 3

Excluding self-citation I am aware of 16 publications that cite **Publication 3**. In addition, it has been downloaded 5,725 times from ORO.

Citations

Farrow, 2014

Scanlon et al, 2014

Jung & Lee 2014

Perryman & Coughlan, 2014

Scanlon et al, 2015

Vogel et al, 2015

Farrow et al., 2015

Julien & Gosselin, 2015

Rodríguez-Ascaso & Boticario, 2015

Iniesto et al., 2016a

Iniesto et al., 2016b

Farrow et al., 2016

Coughlan et al, 2016

Iniesto et al., 2017

Iniesto et al., 2017

Up until this publication was published, little research had been undertaken into the impact of iTunes U, nor of the demographics and motivations of global users of OER, which may explain the relatively high number of citations and downloads since 2013.

The majority of citations for this publication are directly linked to the implications that I drew for disabled learners around access to OER: “Data shows that for both iTunes U and OpenLearn users, those with a disability or who are unwaged are less likely to have achieved undergraduate or postgraduate degree level qualifications and are represented more highly as having no formal qualifications. Non-disabled respondents using iTunes U are significantly better qualified than those declaring a disability. This is also true of OpenLearn users, but the difference is smaller.” (Law et al., 2013, p.209).

Several studies quote the publication for revealing that 19% of OpenLearn learners declare a disability and use evidence from the publication to bolster arguments to have more data on the use of OER by disabled learners (Scanlon et al., 2014; Scanlon et al., 2015; Iniesto et al. 2016a; Iniesto et al., 2016b; Coughlan et al., 2016; Iniesto et al. 2017a; Iniesto et al., 2017b and Rodriguez-Ascaso et al., 2015). Coughlan et al. (2016) emphasise this in relation to distance education in particular: “Accessibility in

open online learning is particularly important since distance education in general attracts more disabled students than traditional education, and this trend is emphasised further in open education.” (Coughlan et al., 2016, p.455).

Further, Iniesto et al. (2016b) describe the importance of OER to meet accessibility standards in comparison with the accessibility of MOOCs: “There is a lack of data on disability in eLearning, either via building profiles or during registration processes... The low level of commitment required to study a MOOC can create an additional difficulty in capturing rich data, however the survey based data from OER content presented earlier (Law et al., 2013) does indicate how this can be overcome.” (Iniesto et al., 2016b p.7).

Farrow (2014) uses the publication to support ideas about a need for a shared evidence base of data around OER users in order to better support OER advocacy and policy. Julien & Gosselin (2015) use the publication to highlight the use of OER to enrich continuing professional development. Vogel et al. (2015) cite this publication to declare that “the barriers to attend a university are now lower than before” (p.108) due to the increasing prevalence of OERs.

Publication 4

Perryman, L.A., Law, P. & Law, A. (2013). Developing sustainable business models for institutions’ provision of open educational resources: Learning from OpenLearn users’ motivations and experiences. In *Open and Flexible Higher Education Conference 2013, 23-25 October 2013, Paris, European Association of Distance Teaching Universities (EADTU). 270–286.*

Summary of Publication 4

This publication was presented as paper for the EADTU annual conference in Paris, 2013 and was published in the conference proceedings alongside **Publication 3**. The paper discusses the case for delivering OER as a business model for a higher education institution. The data for this study drew on a new set of surveys issued on OpenLearn that were specifically placed within OpenLearn courses and

not around the short interactives or topical articles. The intention was to reach non-formal learners in particular i.e. those who had made a commitment to engage in a longer piece of learning through enrolling on a course. Our intention was to examine learner, student and educator motivations for use of OER on the platform, specifically whole courses.

As explored in Chapter 3, the data reveal that university provision of OER at scale can offer learners a bridge to formal education, building confidence, self-reliance and satisfaction. The publication discusses many findings from the data, teasing out the ways that OER on OpenLearn is used by learners (as taster, showcase and to accelerate learning) and discusses the barriers to use of OER, and how OpenLearn's role fits both an altruist and business model.

The publication is the first in this study to mention the rise in tuition fees in England in 2011¹. When **Publications 3** and **4** were being researched, the full impact of the fee changes was only just beginning to be felt: students who had commenced their undergraduate studies prior to the fee increases were able to continue their studies without paying the increased fees, under a transitional arrangement, as long as they completed their studies by 2017 (or 2019 for the Open University's Open degree). Because of the changes to the law, unfortunately, popular short 10-point courses were removed from the curriculum which had hitherto, provided an affordable learning experience for those who did not want to commit to studying a full degree. Hence discussing the altruistic goals of OER provision and the growing use of OpenLearn seemed pertinent as barriers to formal education were being raised and may be adding to the appeal and value of high quality free learning provision. Indeed, the publication notes that 80% of OpenLearn users indicate that the opportunity to study at no cost was a motivation for using the platform.

¹ In 2009, the Browne Report (Browne, 2010) had led to the existing tuition fees cap of £3290 per year being raised to an annual cap of £9000 per year for full-time study in England. In July 2011, The Open University announced that its fees for new students in England would be £5,000 per full-time equivalent study (120 credits) from 1st September 2012. At the same time in England, Government loans became available to part-time students for the first time.

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The publication links risks to retention with increased tuition fees, suggesting that more students may begin to combine part- or full-time study with employment which, in turn, could have a detrimental impact on their retention. This link with retention is picked up in **Publication 9**, written three years later, which reveals that Open University students using OpenLearn are less likely to drop out of their formal studies than those students who don't use OpenLearn. However, whilst it has not been the case that more are turning to part-time study, the media widely report that declining retention rates across the higher education sector are attributable to increased university fees (Turner, 2017; The Times Higher Education, 2017; Sellgren, 2017; The Guardian, 2017; and Higher Education Statistics Agency, 2017).

The publication concludes with a reiteration of the paper's recommendations to broaden OER beyond the needs of the well-educated. It summarises the key relationship for the Open University between paid-for provision and free learning via OpenLearn, and this critical contribution to the open education movements' endeavours around sustainability. The publication contributes to the argument for delivering OER as a business model for higher education institutions by providing a bridge to formal education, building learner confidence, self-reliance and satisfaction; critical to a time of supporting students facing increasing tuition fees and a sector experiencing decreasing student retention.

Citations and reception of Publication 4

Excluding self-citation I am aware of 11 publications that cite **Publication 4**. In addition, it has been downloaded 3,863 times from ORO.

Citations

Jung & Lee, 2014

Farrow et al., 2015

Weller, 2015

Weller et al., 2015

Perryman & Seal, 2016

Weller et al., 2016

Farrow et al., 2016

Markin, 2016

Kawachi, ND

Markin, ND

Mays, 2017

The citations for this publication show its influence in demonstrating a tangible link between OER provision and an institutional business case for embracing open educational practice. Weller (2015 and 2016b) makes several references to the publication to describe this business relationship, describing OpenLearn as having a “recruitment value” (Weller, 2015, p.79) and as a means to improve performance of formal students. The author also describes how such delivery of OER through the delivery of adapted short courses makes the business benefit of the platform a close ally to the perceived function of MOOCs as a taster of formal study. The author also uses the publication to discuss the practice of delivering OER and the relatively high educational achievements of OpenLearn learners.

Perryman & Seal (2016) cite the publication’s top six reasons for learners’ use of OER on OpenLearn. Other citations have used this publication to raise issues about the impact of OER in support of a business model. Weller at al., 2015, Weller at al., 2016 and Mays 2017 quote the click-through rate of learners moving through to formal Open University websites at being at 10% at time of publication, and describe how this is further tangible evidence of a University provision of OER providing a business benefit through direct recruitment.

Publication 5

Law, P. & Perryman, L.A. (2015). Internal Responses to Informal Learning Data: Testing a Rapid Commissioning Approach. *European Journal of Open, Distance and e-Learning*. 76–84.

Summary of Publication 5

Publication 5 was presented at the European Distance and E-Learning Network (EDEN) Eighth Research Workshop in Oxford in October 2014 and was a finalist for best research paper. Following this, I was approached to update the paper and submit for publication to the European Journal of Open, Distance and E-Learning (EURODL) in which it was published in 2015. The publication is a report on the rapid innovation afforded by researching an OER platform such as OpenLearn that returns large numbers of survey responses in a relatively short period of time. The paper specifically draws on the recommendations made by the authors in **Publications 3** and **4** and how these had been acted upon to provide a rapid refinement of open learning content. It enabled me to fully embrace, especially in the light of piloting digital badging, how an open platform based on Moodle technology, was a healthy test bed to rapidly try and evaluate new approaches to unsupported open, online learning provision, with a very large population of learners being prepared to give feedback. The abstract summarises this opportunity afforded by researching large cohorts of learners by stating "how simple research models in the open can bring about change in a short period of time" (Law & Perryman, 2015, p. 76). The 'change' referring to the educators (the institution) and its practice, and for the learners themselves.

The publication highlights the ability afforded by researching large bodies of open learners to rapidly propose the case to pilot badged open courses as a means to recognise informal learning achievements and to motivate learners in response to learner needs. The study drew on new survey data analysed in 2014 that had been gathered by refining and repeating the 2013 OpenLearn questionnaire in order to show a concurrence with the original data set and a further endorsement of the business recommendations that had followed, such as ebook provision to meet the needs of disabled learners and improvements to site usability.

Publication 5 was central to my drive to continue to evaluate OpenLearn because there were still opportunities as yet unmet, particularly around meeting the needs of informal learners. As discussed, this included piloting online, formative assessment and the issuing of digital badges in un-tutored open

courses and responding to issues with platform usability. However, whilst IT constraints hampered OpenLearn usability improvements at the time, these initial data revealed key issues that I returned to in follow-up research and in my day-to-day role.

Citations and reception of Publication 5

Excluding self-citation I am aware of one publication that cites **Publication 5**. In addition, it has been downloaded 486 times from ORO.

Citation

Rienties et al, 2016.

Rientes et al. (2016) describe a “conceptual hierarchy” of free learning platforms that the Open University publishes to in describing its syndication of OER to third party platforms. The authors describe this activity as a means for the Open University to “broaden its presence in mainstream media” (p.47) and is the first of authors citing work in this thesis, to examine the syndication activity of the Open University as part of its OER offering, drawing attention to its uniqueness amongst large-scale OER providers.

The authors quote **Publication 5** to draw attention to its main theme – the ability to gather data and make changes rapidly in an open environment: “The OU has proved very responsive to ensuring the success of the platform and responded quickly to introduce badged open courses, BOCs, following the research outcomes described in Law and Perryman (2015).” (pp.48-49.)

The authors also cite **Publications 8** and **9** entering into some detail around the purpose of the Open University’s provision of OER, its use of syndication as a by-product of publishing to OpenLearn and the author’s developments to issue digital badges for OpenLearn study. Their work supports the notion that OER provision at scale need not be a single platform provision if it is to fully support social mission.

Publication 6

Law, P., Perryman, L.A. & Law, A. (2015). Badging and employability at The Open University. *European Journal of Open, Distance and E-Learning. Best of EDEN 2015 Special Issue, 18 (2).*

Summary of Publication 6

Publication 6 was presented at the European Distance and E-Learning Network (EDEN) conference in Zagreb in June 2014 and was a finalist for best research paper. Like **Publication 5**, it was then published in EURODL in 2015. The paper describes the use of OER as discussed in the 2013 study, but focuses on how OER supports professional development and learner employability. The research presented in the paper describes the practice of developing the BOCs, reveals data around the pilot BOC learners and seeks to justify, based on this data, the need to extend the approach to this particular refinement of OER i.e. to delivering online, formative assessments and associated digital badges.

The BOCs that were issued as pilots were adaptations of the original Bridge to Success courses in English, maths and learning skills i.e. they were repurposed from the extant curriculum of short, entry-level courses that had to be phased out with changes to the UK HE fee structure.

Due to the positive impact of the pilot courses in terms of learner satisfaction and in identifying a particular group of informal learners seeking Open University recognition of their achievements, I was able to propose the development of more badged courses that were then developed as OER in support of employability skills. Critically, from a business perspective, the learners on the pilot BOCs demonstrated a far higher click-through rate to make a formal enquiry than the average OpenLearn learner and thus showed particular potential to extend this offering to support the business model of OER. This finding also marked an important change in my commissioning approach to free courses in that new subjects that sat outside of the University's core curriculum e.g. those supporting employability, were of potentially equal or more value as a business proposition to those that were

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repurposed from the University's formal taught offering. It also provided the potential to work with external partners in providing badges linked with professional qualifications.

Publications 5-11 plot the progress from pilot to business-as-usual activity for the University from 2012 to 2016 in the issuing of digital badges via OpenLearn and the rationale for pursuing this particular refinement of OER supporting both learner and institution.

Citations and reception of Publication 6

Excluding self-citation I am aware of eight publications that cite **Publication 6**. In addition, it has been downloaded 492 times from ORO.

Citations

Coughlan & Perryman, 2015

Witthaus et al., 2016

Glover, 2016

Motheeram et al., 2016

Voogt et al., 2016

Buchem et al., 2016

Cooke et al., 2018

Motheeram et al., 2018

Publication 6 initially focuses on concurrences between the iTunes U and Open Learn 2013 data (given that these were the largest data sets) and how, despite there being a large proportion of well-educated learners, the sheer numbers of participants less well educated or motivated by professional development and confidence-building, was high for both platforms. By asking the same research question of the BOC pilot learners as had been asked of the OpenLearn learner population overall (What are the motivations of learners using the Open University's OER on OpenLearn, iTunes U and YouTube?) and comparing OpenLearn and OpenLearn BOC learner datasets, the paper draws out stark

differences between the two groups and is important for this reason. The BOC learners were significantly different demographically to the main OpenLearn population regarding disability (higher proportions), existing qualification (less well qualified) and were younger. The paper also describes the technical infrastructure in place to manage the issuing of badges through Moodle in the absence of tutors and how future impact of BOCs would be measured with a particular emphasis on meeting employers' needs.

The publication clearly highlights a range of findings important to the development of OER and new technologies and this is reflected in the literature.

Citations for this publication use it to argue for the benefit of digital badges for learners being able to share learning achievements in support of employability (Witthaus et al., 2016; Coughlan & Perryman, 2015; and Glover, 2016). Coughlan & Perryman in particular emphasise the dual benefit to improving employability presented by digital badges described in the publication, of being able to display formal and non-formal achievements together.

The publication is of importance to the literature that seeks to describe the changes in the landscape of MOOC and OER provision in terms of recognising non-formal learners' achievements. The publication uses the term "recognition" in association with badges issued for non-formal learning and which Cooke et al. (2018), Motheeram et al. (2016) and Witthaus et al. (2016) use to support arguments that this is an important development by a free learning provider. Buchem et al. (2016) instead interprets the publication's findings to support a growing movement to use badges as "validation of OERs" (p.23).

Motheeram et al. (2016) uses the publication to support the various categories of digital badge application in terms of their ability for "Recognition and credentialing – to validate, measure, and accredit knowledge and skills... and formalize an identity and reputation, to symbolize an association with a community of group" (p.8). The author cites **Publication 7** several times, choosing also to

highlight the challenge of “demonstrating digital badges as a currency of achievement and credibility and not just a motivational tool.” (p.12)

In citing this publication, Cooke et al. (2018) describe the provision of free courses on OpenLearn overall as "... particularly helpful to OUUK Open degree students, as they provide direct experience of the subject matter (and of online learning) of modules they may wish to study, to supplement the formal description in the online prospectus and to 'extend' the scope of their chosen pathway through their... degree" (p.146).

Voogt et al. (2016) cite **Publication 7** four times and focus on the means to highlight the authors' use of a learning management system (Moodle for OpenLearn) as an exemplar means to issue open badges at scale, versus an individual issuing a badge manually via a badge issuing platform.

Publication 7

Law, P. (2015). Recognising Informal Elearning with Digital Badging: Evidence for a Sustainable Business Model. *Open Praxis*, 7(4): 299–310.

Summary of Publication 7

This publication was presented at the International Council for Distance Education (ICDE) conference in South Africa in 2015 and won the conference prize for Innovation and Best Practice. It was then published in Open Praxis by invitation as a special edition for the ICDE 2015 awards.

This publication is the result of work completed after I successfully obtained Open University Strategic Development Funding (£250K) to investigate and resource the production of the badged courses to which the publication refers, working with subject specialists with particular skills in writing at pre-undergraduate study level. As with all publications in this thesis, the associated research planning, execution and data evaluation was undertaken in my own time.

The publication examines the first suite of six BOCs developed following the recommendations issued in **Publication 6**. Start and end of course surveys that sought to ask questions about motivation and

impact were evaluated alongside website analytics and reported in this paper following the first four-month period of the courses being made live on OpenLearn. The publication draws specifically on the high impact of the BOCs to the Open University, in trying to understand the elements of course design that unsupported learners held to be particularly important. It discusses learner satisfaction, demographics and whether the courses served an outreach function as had been seen in the pilots and the very high click-through to formal enquiries i.e. the business impact.

Because the number of enquiries to undertake formal study at the Open University is shown to be highest in BOCs above any other type of learning content or course on OpenLearn, there is a natural relationship with less qualified learners studying these type of courses on OpenLearn. Critically the publication explores the motivations of gaining a digital badge by this group of learners for whom formal undergraduate study is traditionally not an option (the Open University has no barriers to entry).

The paper refers back to the original concepts of why OER can function as a business model for institutions, with BOCs sitting atop this argument as an important new development within the OER movement.

The publication concludes with the statement that the BOC offering on OpenLearn would be extended based on their initial impact and findings discussed in the paper. This was indeed the case: BOCs went from a project reporting to the Strategic Development Funding arrangement at the Open University, to a business-as-usual activity from January 2016 at a time when the open media production funding was facing increasing annual budget cuts.

Citations and reception of Publication 7

Excluding self-citation I am aware of five publications that cite **Publication 7**. In addition, it has been downloaded 1,310 times from ORO. The editor of the Open Praxis journal was able to provide download data only until November 2016 and reports that the PDF of the paper was downloaded 3,135 times from the journal website until that date.

Citations

Motheeram et al., 2016

Hills & Hughes, 2016

Lane, 2016

King-Pleas, 2017

Motheeram et al., 2018

As discussed in Chapter 3, **Publication 7** is important to this study in that it spans the three themes of this thesis around repurposing OER, the emergence of digital badges in education and how the use of OER can function within a business model. Papers that cite this publication have so far touched on two of these areas: digital badges and the OER movement.

King-Pleas (2017) cites **Publication 7** three times in her paper that discusses the importance of digital badges in advocacy services to students as an important means to reward and recognise learning.

In discussing progress within the OER movement since the 2012 Cape Town Declaration (UNESCO, 2012), Lane (2016) discusses the growing body of research into OER and cites this publication as a new mechanism for “recognition for informal study” (p.45).

Hills and Hughes (2016) write of their scepticism in the use of OERs to assess learning. They cite this publication as one of several that describe the *process* of developing assessment applied in open learning (BOCs) and state that more work is needed to understand “how assessment might support learning” in OERs instead (p.111).

Publication 8

Law, P. (2016a). Digital badging at The Open University: recognition for informal learning. *Open Learning: The Journal of Open, Distance and e-Learning*, 30 (3): 221-234.

Summary of Publication 8

Publication 8 was originally presented at the EADTU conference in Krakow, 2014, then published in the Journal of Open, Distance and eLearning in 2016. The paper builds upon **Publication 7** in discussing the purpose of developing BOCs for OpenLearn in support of outreach and in meeting the needs of learners in having their achievements recognised. The second iteration of the paper published in 2016 allowed me to draw more extensively on the OpenLearn surveys from 2013 and 2014 and updated BOC learner data. It provided me with an opportunity to research in more depth data gathered from the first six BOCs and undertake an updated literature review of digital badges where publications had hitherto been scant and largely consisted of online commentary in the form of blogs. The paper, as expressed in the abstract, highlights the importance of the BOC project (which sees the issuing free open badges and certificates) to the OER movement in particular where there is an emerging landscape of “MOOC providers issuing certification for fee” (Law, 2016a, p.221).

The paper illustrated that the growth in micro credentials was becoming strategically important to higher education, not just in supporting non-formal achievements through OER, but also as an opportunity to support “career development as an essential adjunct to formal study” (p.13). I refer to my own forthcoming research activities – that seek to examine the link between the gaining of a digital badge in support of employability and the associated career impact of this – which I then reported on in **Publication 10**.

Citations and reception of Publication 8

Excluding self-citation I am aware of 14 publications that cite **Publication 8**. In addition, it has been downloaded 943 times from ORO and 895 times from the journal’s website.

Citations

Pernías et al., ND

Ewan, 2016

Ferguson et al., 2016

Field & Tuckett, 2016

Hills & Hughes, 2016

Jackson & Ward, 2016

Motheeram et al., 2016

Rientes et al., 2016

Tripathi & Pandey, 2016

Goodyear & Nathan-Roberts, 2017

Luik et al., 2017

Lane, 2018

Motheeram et al., 2018

Pham & Chen, 2018

The papers that cite this publication show that it was influential in describing the application of digital badges as a new development in higher education. Authors have alighted upon many of the publication's key messages in support of their own arguments. These are described below.

Ewan (2016), in her report for the Australian Government on higher education standards, describes the BOC programme as a whole using the publication to highlight the need for the sector to more formally recognise informal learning achievements by students and non-formal learners. The author also lists me as consultant to the paper overall.

Field & Tuckett (2016) in their UK Government policy paper, discuss definitions of informal and non-formal learning in a modern context and how there are benefits to health and well-being of learning throughout adult life. They discuss the recognition of non-formal learning as one beset by limited empirical evaluation, but draw **Publication 8** into this discussion: "Particularly important in the light

of rapid growth in open online learning is the development of 'digital badging' as a way of recognising informal online learning; again, though, this is still in an experimental stage (Law 2016)" (p.7).

Jackson & Ward (2016) use the publication to lay the foundations for their discussion of the potential for badges in higher education. In particular they cite the paper in reference to the potential for linking "informal learning with the demands of employers" (p.22).

Rientes et al. (2016) describes the importance of the BOC programme at the Open University in offering "micro credit" (p.46) to informal and formal learners. They particularly emphasise how digitally badging free learning supports a business model for OER.

Lane (2018) introduces the use of a BOCs on OpenLearn as a successful instance of "badges... used as evidence within a Recognition of Prior Learning module that forms part of the Masters programme" (p.62) for a particular subject (in this case, systems thinking).

Goodyear & Nathan-Roberts (2017) cite **Publication 8** three times in their paper discussing the relationship between digital badges and educational achievement. They discuss the need "for badges to be more easily recognised in settings without badge frameworks" (p.1231). They cite **Publication 8** as evidence for this by reflecting on BOC learners' desires to print a physical copy of their free certificate upon successful completion of a course, as opposed to knowing how to digitally share it.

Hills & Hughes (2016), writing from the perspective of two authors who had themselves contributed to the authorship of an Open University OpenLearn BOC, reflect on the potential reputational damage of using the Open University brand that I highlight in **Publication 8** (a concern for the pilot BOC project) and how robust quality assurance in course design was required to mitigate this.

Ferguson et al. (2016) take a broad view of the BOC programme, citing it twice and focusing on the recommendations given in **Publication 8** to improve the usability of OpenLearn if informal and formal learners are to fully benefit from the Open University's provision of digital badging in the ways that the publication describes.

Luik et al. (2017) and Pham & Chen (2018) use the publication as evidence for the use of digital badges as a means to reward and motivate learners in MOOCs and mobile learning applications, respectively. Indeed, Luik et al. (2017) cites this publication three times: in discussing the various methodologies used by researchers to gather data about MOOC enrolment; in the use of badges on OpenLearn as evidence of them acting as a motivational tool for learner completion; and as an example of how digital badges can be applied in a free learning environment.

I have included Pernías et al. (ND) as a citation even though it is a published document describing an Erasmus-funded project. It is important because it is the first other educational initiative adopting the acronym 'BOC' that I am aware of to describe an open, badged course.

Publication 9

Law, P. & Jelfs, A. (2016). Ten years of open practice: a reflection on the impact of OpenLearn. *Open Praxis*, 8(2): 143–149.

Summary of Publication 9

Publication 9 was originally presented at the Open Education Global annual conference in Krakow in April 2016 and then accepted as a paper for Open Praxis. This paper arose from a need to understand more about the many thousands of Open University students who participate in non-formal learning using OpenLearn each year. Website analytics could reveal little of the impact on them in terms of how participation in non-formal study related to their formal studies nor on the positive impact that – I hypothesised – non-formal learning could be having on retention in their formal studies. I made the case for this work which was sanctioned by the Pro Vice Chancellor (Learning, Teaching & Innovation) and I was required to report internally on the findings.

The positive results of the study published in this paper, provided me with the impetus to apply for permission to establish an institutional Production Review Project, a 2-year project to improve the design and impact of OpenLearn courses based on the needs of formal students and drawing on what

had been learnt of the relative success of BOCs. The project also drew on my research hitherto undertaken on OpenLearn up to 2015, including website analytics data. The Production Review Project also enabled me to positively influence open educational practice in terms of supporting academic colleagues working to develop new OERs or refine and repurpose existing.

Critically, the results of the research into Open University student use of OpenLearn showed that students who used OpenLearn were 5-10% more likely to progress to their next module. This data became important to the cause for managing the backlog of OpenLearn courses that had developed while my team had had to focus almost exclusively on developing MOOCs for FutureLearn from 2012-2014. It was also essential when communicating to academic colleagues the reliance by students upon OpenLearn for module choice and for boosting confidence.

I created learning design support materials specifically for the purpose of planning and developing open courses. Based on the data reported in this publication, I undertook a range of staff development activities to underpin what I learnt to be good open educational practice for course design that delivers a positive impact for outreach, to best serve our own students and in support of the business mission of OER.

In reviewing the milestone that was the provision of OER on OpenLearn for 10 years, the publication also discusses my work to respond to informal learners' needs over time and against a backdrop of fast-moving technological changes. I wanted to understand if the impact of MOOCs and the increase in people engaged in self-directed informal learning was changing learners' attitudes to Open University OER on OpenLearn. I felt it was of paramount importance to address the usability of the site, to develop alternative formats of all OpenLearn courses specifically in response to disabled learners' needs, and to take the opportunity to syndicate ebook courses to new third-party platforms such as Amazon and Google Play.

Citations and reception of Publication 9

Excluding self-citation I am aware of three publications that cite **Publication 9**. In addition, it has been downloaded 68 times from ORO. The editor of the Open Praxis journal was able to provide download data only until November 2016 and reports that the PDF of the paper was downloaded 725 times from the journal website until that date.

Citations

Rientes et al. (2016)

Mikroyannidis, A. (2018)

Reynolds et al. (2018)

In describing the history and *r'aison d'être* of OER provision at the Open University, **Publication 9** discusses the variety of ways in which the Open University supports educators through its provision of OER, which includes the delivery of the OpenLearn Works platform (The Open University, 2016c). This platform (now called OpenLearn Create) is affectionately known at the Open University as OpenLearn's 'sister site', providing a vital means of delivering learning materials supporting offline study in a variety of languages for developing countries and partnered OER projects with non-government organisations. In a broader discussion about sustainable development goals, Reynolds et al. (2018) allights upon this and describes the Open University's activity in this regard as "technical support for enabling a learning laboratory" (p.691); Mikroyannidis (2018) citing it as a platform for open educators to collaborate and publish original OER.

Rientes et al. (2016) cite this publication three times and discuss how, at the Open University, work is still "to be fulfilled" in terms of understanding the return on investment of OER. However, they use **Publication 9** to argue that "The recent linking of data to allow journeys to be followed beyond enquiry has been a significant step in achieving this" (p.8).

Publication 10

Law, P. (2016b). The Identified Informal Learner: Recognizing Assessed Learning in the Open. In *Open Education: International Perspectives in Higher Education*, edited by Blessinger, P. & Bliss, T.J. Cambridge, UK: Open Book Publishers.

Summary of Publication 10

Publication 10 is a book chapter published in a volume entitled 'International Perspectives in Higher Education'. The book aims to explore the relevant issues of open education in higher education at the theory, policy, and practice levels and the diverse ways in which universities around the world are implementing open education initiatives. My chapter aims to provide a background to free learning provision at the Open University and the impact of BOCs and hence contribute a robust example of the implementation of a large-scale open education provision in higher education.

Qualitative data gathered from researching learners studying the first four BOCs that I had initially reported in **Publication 8** was extended, and I was able to discuss data from over 3,000 respondents. The chapter also provides data on the actual numbers of formal requests to the University as a result of learners studying BOCs, their satisfaction rates, and how learners claim to be sharing achievements with an employer – a recommendation of **Publication 8** to follow up given the absence in the literature to support claims that digital badging could enhance employability.

I chose to deliver a comprehensive break down per BOC of age, language and educational qualification and disability of learners, providing possible explanations for the observed variations between courses. In reviewing the broad landscape of openness and reflecting upon the so-called o-decade (described by Materu (2004) and discussed in Chapter 2 – open source software, open access publishing and open standards) – I introduce the notion that providing free open badges through OpenLearn (a Moodle platform) fully integrates principles of open education provision (see Figure 3 in Chapter 3).

Refining open educational resources for both learner and institution

I chose to conclude the paper with the assertion that Open University delivery and support of BOCs is a sustainable business-as-usual activity for the University, but with plans to extend the provision beyond introductory level to graduate CPD support and as a possible means for an alternative route into formal education. It was the case at the time that academic colleagues were working with my team to develop BOCs as a prior learning requirement for university credit e.g. the compulsory passing of 1-3 free BOCs, followed by the submission of a portfolio of work or a validated exam, for credit.

Citations and reception of Publication 10

I am aware of one publications that cites **Publication 10**. The chapter has been downloaded 57 times from ORO and the book, published by OpenBook Publishers under a Creative Commons licence, has been downloaded fully 2,563 times and been viewed by 12,153 online readers via Google Books and the OpenBook Publishers website².

Citations

Cooke et al. (2018)

Cooke et al. (2018) in describing the growth of the Open University's Open Programme Degree, use this publication to highlight the use of BOCs as a means to provide students with guided preparation for formal study and in doing so, as a means of developing recognition of prior learning at the University .

The OpenBook Publisher's website shows several reviews of the book from various notable writers and contributors to the OER movement. One such is Asha Kanwar (President and CEO of the Commonwealth of Learning), who has the following to say of the book overall:

“In a time of openness vs closure, collaboration vs competition, elitism vs democratisation, this volume presents a range of perspectives that make a strong case for open education in both the developed and developing worlds. A recommended read for all those interested in

² Source: Open Book Publishers <https://www.openbookpublishers.com/product/531/open-education--international-perspectives-in-higher-education%20or%20https://reports.openbookpublishers.com/public/report/10.11647/OBP.0103>

transforming higher education. This book is a rich resource that illuminates the different dimensions of open education and its critical link to human rights. This delivers a very important message: that open education is a powerful tool to throw open the ivory towers and transform higher education in the 21st century.” (Kanwar, A., 2018)

Specifically regarding my contribution to the volume, one reviewer of this book chapter provided the following feedback during the preparation stage. The reviewer highlighted the contribution the chapter would make given the large sample size of the studies cited and the subsequent recommendations.

“Overall this is chapter represents a good contribution to knowledge in the open course space. The paper provides a streamlined summary of contextual factors for the reader, an easily understood discussion of findings, and generalizable principles for open course design. I believe that ... this chapter will be extremely useful for academic teaching staff, and learning designers alike. The evidence produced is used appropriately to build the case and the sample sizes for the survey are commendable. Too often research about open education tends to low identified populations and response rates, and lacks the ability to generalise the findings beyond the immediate context. This paper avoids both of these pitfalls.” (Personal communication from the publisher, May 2016).

Publication 11

Law, P. & Perryman, L.A. (2017). How OpenLearn supports a business model for OER. *Distance Education*, 38(1): 5-22.

Summary of Publication 11

My co-author and I undertook the research reported in this publication, to review the claims we made in **Publication 4** and to examine how, if at all, the motivation to use OER on OpenLearn had changed during a three-year period, with a particular emphasis on the now fully-implemented changes to UK

tuition fees. Claims made as to the reasons for learners using OpenLearn were upheld, with increased proportions of respondents supporting the original claims and more educators using the platform to support teaching.

Publications 4 and **11** refer to increased tuition fees in the UK as a barrier to formal study and to provide some context and possible explanation for changes in attitudes to free learning and expectations from it. **Publication 11** in particular discusses this as a solid commitment to altruism by educational institutions in spite of the rising costs of education provided by those same institutions. The paper discusses in depth the increased importance of OER having both social and business functions at a time of increasing tuition fees.

Importantly, this was the first paper in which I felt confident (and with permission) to discuss the true costs of production of OpenLearn courses as a repurposing of formal taught provision in order to illustrate the relatively low resource required to undertake this activity (as noted in Chapter 3). Up until that point, information about costs to refine content for OER was alluded to but not discussed in detail given the sensitivity of releasing financial data. The increasing provision of MOOCs and associated increase in publications around the subject of their development had reduced this sensitivity.

The publication concludes with the many ways in which OpenLearn is providing a bridge to formal learning and why regularly evaluating users' use of free learning is important (given changes in only a three-year period):

“Above all, though, attentiveness to the needs of learners through systematic research studies can help universities to realise the business benefits of delivering OER, find affordable ways of increasing social and educational equity and sustain a robust mechanism for generating new student registrations.” (Law & Perryman, 2017, p.20)

Citations and reception of Publication 11

I am aware of one publication that cites **Publication 11**. It is not available for download from ORO due to the licence restriction of the publisher. The abstract has been viewed 191 on the publisher's website.

Citations

Mncube, 2017

In the context of discussing the benefits of new elearning initiatives, Mncube (2017) cites this publication to support the argument that open learning can reduce costs to students and improve drop-out rates.

One reviewer of this publication provided the following feedback during the preparation stage:

“This article reports on three surveys that should be of relevance to an audience engaged in using or developing OER resources and/or interested in how OER are used by students, thus fitting in well with a journal that publishes work done in the context of distance education. The methodology seems appropriate to investigate this topic. The paper is generally well written and has been a pleasure to read.” (Personal communication from the publisher, November 2016).

Contribution by the author to publications

The following table summarises how each of the themes of this thesis relate to the publications described, and the author’s contribution to each.

Table 5. How each publication maps to the themes and the author’s contribution to each.

Theme 1. The challenges of repurposing informal learning content as OER.	Research highlighting the challenges to institutions of the refinement of OER but overall, the benefits to learners, in particular, establishing the breadth of challenges that the refinement and delivery process of OER bring about.
Theme 2. Supporting the motivation of learners using OER.	Research exploring the changing motivations of informal learners using OER. This work maps the application of digital badges to OER at the OU, their associated impact and benefits in marking subject engagement and career development.
Theme 3. The refinement of OER in support of the social and business mission of delivering it.	Research into the business benefits of OER with large-scale case studies of how refinement of OER can support this. The rapid and impactful response to ongoing research of learners using OER demonstrates business and social benefits.
<i>The author’s contribution</i>	
Publication 1. Theme 1	First author and presenter of paper. Minor contributions by the other project leaders of the Bridge to Success project.
Publication 2. Theme 1	Third author. The author’s contribution was in helping to design and frame the challenges of OER through a role required to summarise and disseminate the work of the OLnet project’s 30 research fellows.
Publication 3. Theme 1 Theme 2	First author and co-presenter of paper. One of two key outputs of the author’s role as a Research Fellow for the OER Research Hub. Research questions and associated work, instigated entirely by the author.
Publication 4. Theme 2 Theme 3	Second author and co-presenter of paper. The paper represents the second key output of the author’s role as a Research Fellow for the OER Research Hub. Research questions and associated work, developed jointly with first author.
Publication 5. Theme 3	First author and co-presenter of paper. The work that this paper describes was instigated by the author; the second author is included as the paper draws heavily on data discussed in Publications 3 and 4 .

Publication 6. Theme 1 Theme 2	First author and sole presenter of paper. Research and associated scholarly and institutional developments, instigated by the author. Contributing authors provided critical readership.
Publication 7. Theme 1 Theme 2 Theme 3	Sole author and presenter.
Publication 8. Theme 2	Sole author and presenter.
Publication 9. Theme 1 Theme 2 Theme 3	First author and presenter. Second author jointly managed a survey to formal students that this publication discusses. Second author provided critical readership.
Publication 10. Theme 1 Theme 2 Theme 3	Sole author.
Publication 11. Theme 1 Theme 3	First author. Publication developed with second author to review claims made in Publication 4 and to examine change over time. Majority of research and analysis undertaken by author.

Awards

The Badged Open Courses project led by the author, was the first to issue university-branded open badges as part of an OER offering. It was undertaken specifically with the dual purpose of reaching non-formal learners and students alike. As a result of this and the work to critically evaluate the motivations of learners using OER, a number of the publications in this PhD by Published Work have won, or have been nominated for, awards. These are listed below in Table 6.

Table 6. Awards for the work described in this PhD by Published Work

Awards and Nominations	Awarded by	Date	Awarded to
Finalist. Best Research Paper (Publication 5).	European Distance Education Network, Oxford.	2014	Patrina Law and Leigh-Anne Perryman
Finalist. Best Research Paper (Publication 6).	European Distance Education Network, Zagreb.	2014	Patrina Law

Winner. The Open Research Award for Open Research Excellence.	The Open Education Consortium.	2015	Patrina Law and Leigh-Anne Perryman
Winner. Award for Innovation and Best Practice (Publication 7).	International Council for Distance Education (ICDE).	2015	Patrina Law
Finalist. Initiative of the Year.	The Times Higher Education Awards.	2015	The digital badging project at The Open University, led by Patrina Law
Finalist. Innovation in Learning.	The Learning and Performance Institute.	2015	The digital badging project at The Open University, led by Patrina Law
Winner. Creative Innovation.	The Open Education Consortium.	2016	Badged Open Courses at The Open University, led by Patrina Law
Finalist. Excellence in the design of learning content - public and non-profit sector.	The Learning Technology Awards.	2017	Badged Open Courses at The Open University, led by Patrina Law

Citations and receptions of the publications presented in this thesis show that it has made a contribution to the literature around the main themes described in Chapter 3. Chapter 5 concludes this thesis by providing a summary of conclusions overall and the developing future direction of OER and digital badging for higher education.

Chapter 5 Conclusions

The refinement of the types of OER presented in this thesis (online provision of learning) show that there is an economy of scale to institutional delivery of OER, but that robust open educational practice and course design is the key to successful impact.

Weller et al. (2017) in their paper entitled ‘What can OER do for me? Evaluating the Claims for OER’ remind us that OER is an emerging discipline of only 15 years, is therefore still in its infancy and that research remains important if it is to influence future strategy in this arena. They argue that “In order to realize the ambition of mainstreaming OER then there are two research related aspects. The first is that this type of objective, impact research becomes part of all implementation projects. The second is that it is communicated effectively to help shape strategy” (p.76). The publications submitted in this thesis have aimed to show both these things through demonstrating impact research as part of an institutional commitment to OER and through the dissemination of OER research to influence policy and strategy in the wider community. In doing so, the papers in this publication have also contributed to the even more embryonic discipline of the application of digital badging to education and recognition of informal learning.

In addition, my findings are within the theoretical model of pragmatism and provide a contemporary example of the theory in action. I have demonstrated that pragmatism – as a learning theory for the future – is particularly suited to OER provision and refinement against a backdrop of future-looking technological affordances for online, non-formal learning provision.

The data-driven research undertaken during the time period covered by the publications in this submission, has led to some surprising but irrefutable conclusions. In particular the importance of the refinement of OER to support business and social mission and more generally, the power of recognising non-formal learning through micro-credentials. These findings have implications that extend beyond one institution’s OER policy, with relevance to the design and curation of OER globally

to better serve the employability needs of learners, particularly those who cannot afford formal study. They shine a light on European provision of OER and open educational practice where the literature had hitherto been dominated by US-led and US-focused research.

The limitations of the mostly surveyed-based research methodology of human subjects described in the publications for this thesis, are around the likelihood of different interpretations to questions by learners i.e. this subjective interpretation of the meaning of questions can provide skewed results (Pedersen, 1992; Kelley et al., 2003). Similarly, despite the use of Likert scales in many of the survey's response options, this cannot fully capture a learner's depth of feeling nor emotional response to a question. For surveys issued on OpenLearn that were aimed at reaching a representative sample of the user base overall, issues around accessibility also cannot be ignored.

It should also be acknowledged that, as a higher education professional operating with scholarly intent i.e. performing a blended role, comprising elements of both academic and professional activity (Whitchurch, 2009; Whitchurch & Law, 2010) I did have the support of research assistants, nor a senior academic mentor on a day-to-day basis. Instead I relied on networks with colleagues in purely academic roles both internally and externally, to provide feedback and assurance that my work was robustly executed and planned.

Whilst I do not hold an academic post, the results of the research outputs recorded in this thesis, have personally resulted in a variety of requests to serve in an academic context for the Board of Advisors for the Digital Credentials Institute and on the Executive Board for Digital Credentials for the IMS Global Learning Consortium (US-based). Because my research has become quite widely known, I have been given presentations, keynotes and webinars. In 2017 alone, this included The US National Distance Learning Week, The Centre for Recording Achievement (UK) and 'Women in IT' for UNISON. I have been asked to speak for the Open University on open and informal learning strategy, both to external visitors (other senior academic teams and civil servants), at various UK government

departments and at campus-based conferences. Associated presentations on SlideShare have attracted over 7,000 views.

In 2016 I co-organised the first UK conference entitled 'Digital badging for Higher Education' at Southampton University. In 2017 I was co-chair for the IMS Global international conference entitled 'Modern Employment and Digital Credentials' at the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA) in London and gave a keynote at this event.

The subject of future papers will continue to highlight how a focussed response to learners' needs to vastly improve usability and accessibility, and to meet professional development needs can provide a considerable impact on business mission of delivering OER. For example, recent internal website analytics show that in the year (2017-18) since the redesign of OpenLearn (which was based on data discussed in this thesis), University account registrations increased from 100,000 to 186,000 (i.e. the number choosing to enrol onto a free course in order to gain a free certificate or digital badge and hence providing a business opportunity to the University for follow-up) and the number of learners viewing free courses increased from 70,000 to 2.4m. In addition, to date (April 2018) over 11,000 Open University badges have been issued via open courses on OpenLearn. These extraordinary statistics will help to further demonstrate the worth of OER at a time of considerable financial upheaval across the sector and to support its survival as an important outreach activity.

However, despite the increase in research publications within the fields of OER and micro-credentials in education, there are still areas that are under researched. One of these is the application of digital badges to OER, which I have shown to be highly impactful in my studies. There is a huge potential to bring together the worlds of OER and micro-credentials more cohesively in offering a framework of employability and core work-related skills needed for a digital economy and underserved groups.

The development of digital educational transcripts, validated and endorsed by employers and educational institutions is still early in development although important to recognise a range of achievements – both formal and non-formal – that learners are currently achieving through the

provision of MOOCs and OER. Fain (2016) and Wright (2016) assert that digital badges are helping to display what transcripts fail to capture. Wright (2016) notes that “Digital badges have the capacity to transform the way students share their academic accomplishments. Right now, students rely upon paper degrees, transcripts and certificates to prove to employers that they have the skills and abilities they need to succeed in a given job. These are challenging to understand, challenging to verify and, ultimately, don’t do much to communicate the work a student has put into their education” (paragraph 1).

In support of this, work at the Open University in 2018-19 led by the author will develop a formal recognition of digital badges earned by Open University students on OpenLearn, alongside formal achievements on the student record. In the absence of the Higher Education Achievement Report (HEAR, 2016) being developed, the project will deliver a systems integration between formal and informal study and provide a means for students to link their University-branded badged informal learning achievements to their formal student record, and vice versa. The intention, based on evidence from research represented in this thesis, is that this will enhance students’ career prospects and provide seamless recognition for co-curricular learning and OU-branded professional development that students can share with potential employers at any stage of their studies.

The author’s keynote for the European Summit for Modern Employment shows this linking together of formal and non-formally learning for employability in particular, in how the Open University’s new Employability Framework will be delivered both via a co-curricular (via OpenLearn) and curricular means. This combining of formal with non-formal learning in support of employability for formal students is summarised in Figure 4³ revealing core skills and competencies as concepts that can be introduced via co-curricula, badged courses.

³ The full presentation given jointly with the HEA in London in 2017 is available on Slideshare <https://www.slideshare.net/patrinlaw/how-digital-credentials-can-support-a-higher-education-framework-for-employability>

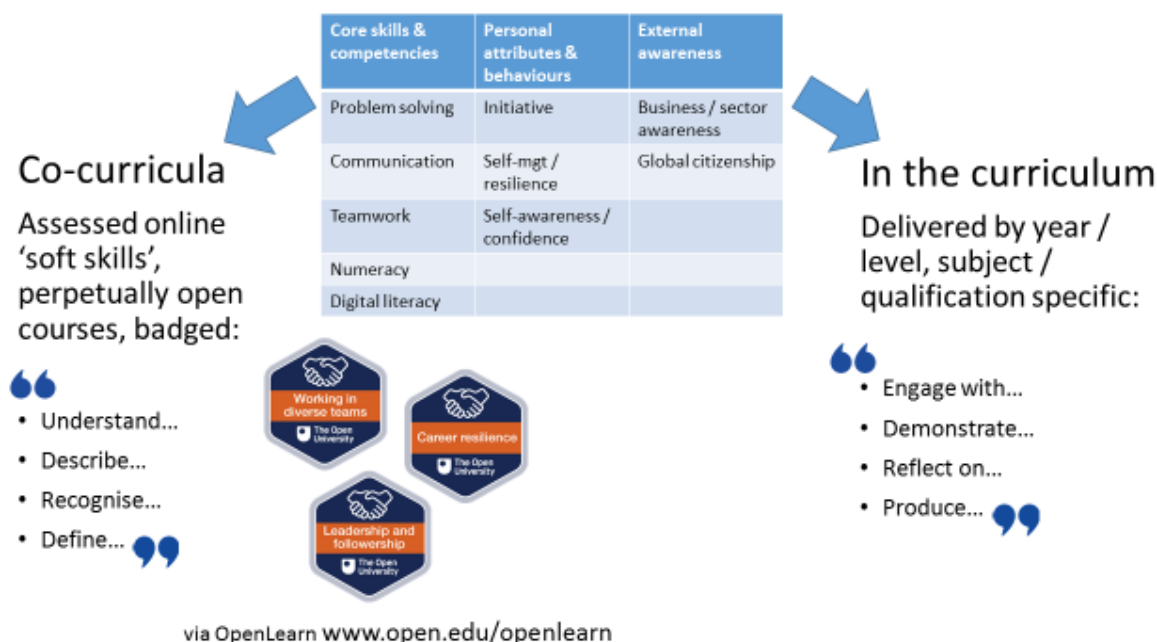


Figure 4. Digitally-badged courses supporting the OU employability framework.

Taylor (2017) in his report on modern working practices for the UK Government, notes that “It is very obvious to us that many of the skills that employers are demanding are cross-cutting and will not be developed in full in a purely academic setting” (p.87) and that a way of “...enabling individuals to easily demonstrate their skills and experience could be through the use of digital badges, a form of flexible online accreditation, which employers and education providers can award to individuals” (p.88). Taylor’s particular view of modern working in a ‘gig’ economy has particular resonance to the ongoing delivery of digital badges in core ‘soft skills’ for employability on OpenLearn. He goes on to state “It’s clear therefore that individuals will expect to carry on learning throughout their working life, whether continuously or periodically. We know also that there are significant barriers to them doing this and that this disproportionately affects those at the bottom of the labour market” (p.88).

The University for Industry’s (UFI) CEO has also noted the contribution that micro credentials may have to make in meeting some of the challenges currently faced by employers. She states that they have the potential to “offer versatile, flexible learning which is more accessible and enables learners to better fit learning into their everyday lives” (Garrod-Waters, 2018) (para 2).

The relationship between employability and the application of digital badges to non-formal learning is discussed in the latter publications of this study and will become the focus of future research, as employers increasingly become endorsers of informal learning activities.

This clear link between research, action, practice and influence on strategy are core to the research activities discussed in the publications for this study. In retaining scholarship and open educational practice at the heart of these publications, I have made a demonstrable contribution in the following ways:

- The associated recommendations have influenced OER policy and open educational practice at the Open University.
- Empirical evidence has shown that institutional delivery of OER can positively impact business and social mission.
- The exposure of large-scale case study data around the use of open badges has influenced debates on the role of micro credentials.
- Empirical evidence has revealed the use of OER by formal and non-formal learners at a time of unprecedented change in mobile access to the Internet.
- The thesis has provided a modern definition of non-formal learning.
- The publications have been cited by national and institutional policy papers.

The publications in this thesis have tracked the correlation between the refinement of OER for social and business impact with the resulting influence on open educational practice and policy. I have proved beyond reasonable doubt that a highly-structured approach to the design of OER can deliver benefits to learner and institution, but that there is a critical need for further work in the area. For example, to connect the acquisition of micro-credentials with a journey to formal learning to recognise prior learning and to better align learners' employability desires with OER and digital badging policy. Although small-scale studies have produced positive results, it remains the case that the application of open badges to online courses is usually assigned to closed groups and platforms. Whilst the

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remaining large OER providers are focusing on curating and assessing OER for formal undergraduate or professional qualifications with associated for-fee credit, it remains that there is great potential to apply digital badging for free, to other large-scale OER provision and in the not-for-profit sector.

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