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Openness and Education

Advances in Digital Education and
Lifelong Learning, Volume 1

Andreas Meiszner (Editor)
Lin Squires (Editor)



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Advances in Digital Education and
Lifelong Learning, Volume 1

Andreas Meiszner (Editor)
Lin Squires (Editor)

Bart Verspagen (foreword)
Richard Straub (foreword)
Markus Deiman (chapter 1)
Peter Sloep (chapter 1)
Michael Shaw (chapter 2)
Ad Notten (chapter 3)
Martin Rehm (chapter 3)
Ruediger Glott (chapter 3)
Petra Hagemann (chapter 3 – case study 1)
Balthas Seibold (chapter 3 – case study 1)
Lex Bijlsma (chapter 3 – case study 2)
Ioannis Stamelos (chapter 3 – case study 3)
Pantelis M. Papadopoulos (chapter 3 – case study 3)
Anthony F. Camilleri (chapter 4)
Anne-Christin Tannhäuser (chapter 4)
Pascale Hardy (chapter 5)
Dominique Lelievre (chapter 5)
Evangelia Katsikea (chapter 5)
Andy Lane (chapter 6)
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Introduction

Introductory message by Prof. Dr. Bart Verspagen - Director UNU-MERIT

ICT has dramatically changed our lives, and is still changing it in ways we could only have imagined a couple of years ago. The pervasive, networking nature of this technology has impacts that reach far beyond the economic domain, affecting many aspects of our social life. The notion of the “network society” has become intrinsically associated with ICT. It is changing how we interact and behave at work, as well as in social interactions and the way time off work is spent. It is changing the relationships between government and society. And, it is changing the way we learn.

The concept of ‘open education’ is central to the developments and trends in ICT-enabled learning. It promises to allow for a higher level of (digital) inclusion, and for the provision of innovative open educational services of high socio-economic impact. When ICT and open educational resources are appropriately developed they can significantly affect economic growth and provide alleviation from poverty. Many developed and particularly developing countries and their citizens will gain from improved access to education and the development and localization of open educational services that truly fits their needs. Open educational services that meet actual local needs can also have a high impact in the poorest and most remote areas, regions affected by the “Digital Divide”. Such regions could even emerge as leaders in the next phase of the global educational service economy – e.g., ‘educational offers with a soul’ that address societal needs. Especially in developing countries or poorer regions the number of open education producer communities and the variety of open educational service solutions is likely to increase greatly through open educational approaches. What is required at this point of time, however, is a reinforced focus on research and development in open education and open educational services, and to put these issues at the top of the political agendas.

Research and development in open education and open educational services must produce convincing evidence to show how open education and open educational services can have an impact on the development of national

economies and society as a whole, building policy support for open education and fostering its public adoption. Such evidence would pave the way for new business opportunities within the open education domain, which does not exist on a large scale at the moment and still constitutes a niche market, but with great potential to be tapped and expanded.

This volume is a step forward in this direction, with high-quality and relevant contributions from a range of top-level researchers in the field. I therefore recommend the volume wholeheartedly to all who are interested in the learning potential of ICT, and in particular to policymakers, who will have to play a crucial role in realizing the potential that is so obvious.

Introduction

Introductory message by Richard Straub – ELIG Secretary General and Ex-Officio Executive Member

The Management Thinker Peter Drucker once reminded us that: „The most serious mistakes are not being made as a result of wrong answers. The truly dangerous thing is asking the wrong question.“

Technology enhanced learning has for long been concerned with questions of scale, access and efficiency. Currently, massive open online courses (MOOCs) are impressively demonstrating how individual courses can reach over 100.000 initial participants. Also Open Educational Resources have been around for over a decade and certainly have done great benefit to making educational resources widely shared.

One challenge is to use technology widely in learning. An other one is to use technology wisely. Learning Industry as well as policy makers tend to measure technology enhanced learning by distribution. We need to turn this towards a discussion on impact.

Our world is increasingly complex. As I have expressed in a recent blog post for the Harvard Business Review: „simplistic ‘can do’ thinking and linear approaches in organizations and markets, which are by definition complex, won’t be sufficient. And it is the prod to us to better understand why.“¹

This complex world demands rethinking education at a more fundamental level. So by opening up education we should not only aim to provide more efficient and widely open access to the education of today. We should aim to shape the education of the future. This should start by asking very fundamental questions: what are the skills and competences that we need in the future? How can Open Education support them? How will learning be different from the learning of today?

This book is investigating these tough questions across different domains of education: K12 school education, higher education and life long learning. It is published at an important point in time for Europe while the Euro-

¹http://blogs.hbr.org/cs/2013/05/why_managers_havent_embraced_c.html

pean Commission is launching a large strategic initiative on „Opening up Education“.

I wish that this first book of our new ELIG series on Advances in Digital Education and Life Long Learning will have a strong impact on this important debate. I am convinced that it poses the right questions at the right time for the future of Digital Education while bringing this in context with the most innovative practical developments in Open Education around the world.

Richard Straub

Deputy Secretary General ELIG

Founder & President Peter Drucker Society Europe

Executive Committee – European Foundation for Management Development

Introduction

Elmar Husmann, Florence Rizzo; ELIG

Open Education is a concept that gains increasing relevance. In 2011, ELIG surveyed over 80 organizations – including leading education institutions, NGOs and industry. This resulted in an ELIG white paper called “Open Education: a wake-up call”¹. A shared perception of our stakeholders was that while they still sensed a gap between expectations towards Open Education and current reality², we would stand at the beginning of a new growth phase of open practices in education that could have a significant impact on all domains of education.

Open Education and the Open Educational Resources (OER) movement are sometimes regarded as synonymous. However, as we will investigate in detail in this book, Open Education is a wider and more multifaceted concept compared to OER. In particular, it is based on a richer understanding of openness that goes beyond the access or collaboration on open resources.

The development of the past years supports this perception. We can see quickly growing interest and start-up activity on MOOCs (massive open online courses) with organizations like edX, Coursera or Udacity, a growing popularity of open peer learning with organizations like P2PU, the growth of open social networks for educators like TES Connect in the UK or the engagement of big industry player into educational platforms like Apple’s iTunes U.

There is also a rising global spread of Open Education beyond western industrialized countries. Open Education turns increasingly out as a promising approach for global educational collaboration and development. An example that is discussed in this book is the TESSA initiative for teacher/educator collaboration in sub-Saharan Africa. One key aspect of Open Education is to take education out of the classroom. But it is doing more, It is also challenging the usual quality – exclusivity (and cost) dependency found in traditional education systems. It therefore supports equal access to education opportunities and global democratization of education.

¹ Online available via <http://www.elig.org/we-share/publications/>

² see also the ELIG article “Closing the gap” in the EFMD Global Focus Journal (Volume 06, Issue 01-2012) via the ELIG site or www.emf.org/globalfocus

It is also more than an effective global delivery mechanism for education beyond the classroom. Many interesting developments in Open Education relate to new forms of social learning that challenge traditional roles in education systems – as well as the relation between learners and teachers.

A related concern that is addressed by Open Education is the better integration of education into our everyday lives as something that becomes an integral (lifewide learning) activity rather than being constrained into dedicated places and times. At the same time Open Education is also about better leveraging different and unusual spaces and places for learning.

Open Education can not be discussed without a look at its interplay with pedagogy. Open Education supports self-paced and individualized learning. It can in fact be greatly supportive of 21st century skills – such as collaborative, social or explorative skills. In return, Open Education also puts specific demands e.g. on intrinsic motivation and self-organization. We need to make sure that it will not just increase the gap between well-educated learners and marginalized learners.

Much has been written about the cultural changes that the Internet has triggered in our societies – in our work and private lives, in our communication and social relations, for business and civil society. At the turn of the millennium it was sometimes claimed that education could be the area that will be most profoundly changed by the Internet. But while change in education is slow, there is increasing evidence that fundamental change is underway as the Internet is supporting the opening up of education.

The intention when initiating this book was to provide a balanced perspective of this complex change. Also, we wanted to highlight the different parallel and interwoven elements of Open Education. Particular attention was given to providing concrete evidence and analyzing practical Open Education cases from different parts of the world as well as to quantifying and comparing current developments trends.

This book has been developed in close partnership with the United Nations University (UNU) while ELIG has also been involved with the UNU in shaping its own strategy towards Open Education. This is closely linked to the UN mission and includes a particular attention to aspects of localizing global available educational offerings as well as to providing educational opportunities as either for free or at local economic rates. Therefore, this global use of Open Education has been a secondary focus of the book.

The UNU has decided – as other education institutions – to combine open online with more traditional on-campus learning. We also suggest that Open Education is not a concept in opposition to other forms and practices of education but rather an enrichment and extension.

Several of the cases and studies in this book relate to initiatives funded by the European Union, and indeed it should be strongly welcomed that the European Union has made Open Education a strategic priority. As of the publication of this book in 2013, the European Commission's Directorate on Education & Culture is starting a large strategic initiative called "Opening up Education" in partnership with the Directorate for the Digital Agenda.³

This book starts with the investigation of the conceptual roots of Open Education as well as of the current state-of-the-art. It then turns towards specific case examples and concrete issues when designing an Open Education strategy. In the later part of the book, the perspective will be widened again towards the socio economic impact of Open Education.

Markus Deiman and Peter Sloep start in Chapter 1 by discussing the interplay of different perspectives on Open Education – as characterized by a mixture of economical, moral and social claims. They further demonstrate conceptual roots of Open Education in the educational reform movement of the 1960ties and 70ties – such as in Open Classroom/Open Learning – while explaining its further development until today in the interplay with information and communication technologies. This includes online distance education, eLearning and the sharing of open education resources (OER) that started to grow strongly in popularity at the turn of the millennium.

Michael Shaw provides in Chapter 2 an overview about the current state of Open Education in practice and gives a lot of statistical evidence on the growth rates and trends. He further highlights Open Education developments outside the domain of higher education and the importance of Open Education for K12 schooling while analyzing in more detail the successful TES Connect UK teacher community. He further discusses the popularity of Open Education for life long learning – even beyond particular interest of learners to gain a degree.

Ad Notten, Martin Rehm and Rüdiger Glott investigate then in Chapter 3 further the unbundling of the educational "package" provided by traditional education institutions into different open elements and services.

They illustrate this in more detail at four cases each highlighting different aspects:

- the Open University of the Netherlands – a European higher education institution with a particular strong track record in embracing Open Education through several European and national initiatives
- ict@innovation – an open program targeted at small to medium sized business in Africa supported by the German Federal Ministry for Economic Cooperation and Development

³ This initiative is a key pillar in the overall strategy of the European Commission "Rethinking Education" aiming to maximize the impact of information and communication technologies for learning http://europa.eu/rapid/press-release_IP-12-1233_en.htm

- the openSE software engineering program supported by the European Union that embeds computer science students into global Open Source projects
- an investigation on the role of public- or university libraries as well as public information services in Open Education

In Chapter 4, Anthony Camilleri and Anne-Christin Tannhäuser describe options for the assessment and recognition of learning outcomes in Open Education. In particular, they investigate practices used by current MOOC providers and educational institutions as well as the development of related testing, assessment and accreditation. A related issue is the integration with credit transfer systems such as the European ECTS or the American ACE CREDIT. Their analysis of the current market shows a wide range of used mechanisms from relying on classical testing centres to peer assessment.

It seems likely that in the future whole study programs will be combined from different Open Education modules or that such modules can be seamlessly integrated with traditional forms of education. Already are first universities testing to replace entry-level courses with popular MOOCs. An important topic in this context is the integration and transfer of electronic credentials gained from different Open Education providers. The authors discuss trusted mechanisms that are already emerging to support this.

Pascale Hardy, Dominique Lelievre and Evangelia Katsikea investigate in Chapter 5 the corresponding business and funding models for Open Education. Education has always been a domain where market mechanisms and commercial activities are in interplay with other forms of financing and organizing – such as through public sources or philanthropy.

For the learning industry, Open Education is raising similar issues as Open Access has done for the publishing industry or Open Source for the software industry. So it comes as no surprise that many of the Open Education examples mentioned in this book have close links to education institutions or are financed with the help of foundations or public sources. On the other hand, Open Education might gain a further boost once it becomes more strongly supported by the learning industry. Already first examples are visible e.g. testing or platform services.

In Chapter 7 finally, Andy Lane takes a look at socio economic impacts of Open Education by investigating different aspects of openness. He foresees a mixed economy of for free and for fee resources. In his view, contributors outside of the formal educational systems (such as from learned societies, not for profit companies, public bodies and corporations) will generate a large part of open educational resources. Thus Open Education

would provide a deeper integration between our education systems and the knowledge society.

This is another interesting perspective on Open Education where openness is largely understood as opening up the educational systems to a deeper interaction and more input from the outside world where knowledge is created, expressed and learning takes place on an almost continuous – while less formal - basis.

Throughout this book, you will be able to retrace a number of such diverging demands and perspectives on Open Education. It can be seen from the cases and examples discussed in this book, that rarely all aspects of Open Education are realized at once but that each of the cases gives a different emphasis.

A first pair of diverging demands is the demand for effective open mass delivery (as in the case of MOOCs) on the one hand and the demand for intensive co-creation and peer production on the other hand. Standardizing mass delivery has clear advantages in effectiveness, assessment and ensuring a consistent quality. However, it can be an insufficient approach for domains that have a lot of local diversity and where most of the knowledge is distributed “on the ground” – like e.g. in teacher networks. We need to think about new open processes that will allow controversies and provide cultural perspectives on world’s knowledge.

Already are some Open Education approaches providing access to wider communities and actors that are not typically engaged in the education system. An example is the European *we.learn.it* initiative⁴ on creativity and exploratory learning in schools that supports schools in realizing creative projects in partnership with external “explorers” such as filmmakers, scientists or nature explorers.

A second pair is the demand for open (and often free) access of education resources versus the legitimate interest of creators of content to be incentivised. This in particular holds for complex and difficult-to-produce content – like e.g. schoolbooks or films. Many of the current OER platforms therefore contain resources that are produced rather as by-products by educators (like course material) than material that has undergone a rigid design and production process. The “copy left” movement is trying to provide a new way of thinking about intellectual property law but it remains a work-in-progress. Creative commons licences are still not widely used.

A third pair is the demand for accreditation, for measuring learning outcomes and certification on the one hand and the informal side of Open Education on the other hand that is obviously attracting so many people even apart from any interest in formal recognition. Learning anything everywhere at

⁴ *we.learn.it* is an initiative funded by the European Union and coordinated by the Aalto University’s Design Factory. It includes several partners such as ELIG and Intel. The OECD and the London Institute of Education are responsible for educational impact assessment.

any time is a great objective to enable every human being to grow as a life-long learner. This is going to be a strong challenge for the future job markets, for recruitment and HR. Cross-disciplinary skills are needed but how do we make sure that they are well mastered when people are learning bits and pieces in a wide range of learning environments? And is the current system of academic credits and certificates still appropriate for this?

The book is completed by two comments that provide outlooks on Open Education in the context of K12 schooling and work related continuous education.

Chris Dede describes how Open Education has the potential to “disrupt the classroom”. One aspect that he investigates is the contribution of Open Education practices to building advanced skills and knowledge (such as intra- and interpersonal skills). This demands a learning that is on the one hand student-centered and personalized while on the other hand being connected in and out of classrooms. This connectedness also supports that learning becomes a life-wide and life-long activity rather than being constrained into time spent in schools and classrooms.

Jeanne Meister has a similar perspective on Open Education practices in corporate learning and analyzes this at the example of the emerging use of MOOCs for corporate learning.

Through the course of this book you will therefore see a lot of evidence on the value of Open Education. At the same time, this book cannot provide a simple recipe for Open Education. Rather the opening of education has to be understood as a continuous development that needs to be considered by any education researcher, educational practitioner or institution leader.

Our claim is that Open Education provides a road to deeply modernize education to the challenges of tomorrow, to support complex skills and to adapt education better to the demands of a knowledge society. We wish that this book provides a profound basis for this important debate and development.

1.1 Chapter 2: Open Education in Practice

Michael Shaw, deputy editor of the Times Educational Supplement (TES), UK

Abstract

This chapter makes the case that school-related material and informally-used content need to be considered equally important as complete, higher education-level courses when exploring how open education is used in practice. It provides a brief overview of several key Higher Education (HE) and school-related Open Education (OE) projects, what they offer, their approximate reach and the significance of established brands, with short case studies of TES Connect, Khan Academy, and TESSA. It also examines the evidence of impact on students, and how some of the projects counter criticism that they promote “closed” forms of traditional, instructor-led education through blended and flipped teaching approaches or peer-led learning.

The purpose of the chapter is to explore how OE sites are used in practice by examining some of the key projects that provide free materials to students and to teachers.

This chapter provides an overview of some of the biggest OE providers online, drawing particular attention to those that provide school-level material instead of just higher-education level resources. It examines the motives of Open Education Resources (OER) users, and provides mini case studies of a selection of HE-level and school-level projects. It also explores the reach and impact of the schemes, the significance of brand, and the criticism that they simply provide a new form of “closed” education. This provides a handy overview of key OE projects, and an introduction to the significance of school-related projects. It should be a source of material of especial interest to those involved in teacher training or development, or in OE from either a school or university angle.

This chapter makes an original case for school teachers to have greater recognition in the discussion about Open Education, and reveals a finding from an international poll of more than a quarter of million teachers who use OE resources with their students.

Findings of this chapter indicate that the significance of school-level OE has been underestimated, given the extent of user-generated teaching material available and teachers’ powers to multiply the reach of a single downloaded resource to several classes of students.

The overview however is not exhaustive, and the author stresses the problematic nature of attempting to compare projects that deliver different kinds of content for different contexts.

Keywords: Teachers, Schools, Open Education, Resources, Higher education, MOOCs.

1 The audience for Open Education

To understand how Open Education (OE) projects are being used in practice, it helps to consider first who is using them, and why.

It might be tempting to imagine that OE users exist along a spectrum of formality. At one end we might picture the most casual user – the person idly watching a TEDx lecture on their iPad as an alternative to a TV programme, perhaps. Then at the other we might place the committed student doing formal study, perhaps someone sitting for weeks in an internet café in Bangladesh completing a fully accredited, university-level course.

However, there are multiple problems with perceiving OE use in this way. A key problem is that one of the most significant groups of OE users does not fit onto this formality spectrum: the users who are not the end-learners themselves, but their teachers. They may only log on quickly, but are picking content to share with students.

OE has sometimes been treated by researchers as if it were almost entirely a matter for Higher Education, HE, (perhaps - it might be cheekily suggested - because academics matter in HE). The OECD (2007) paper on Open Education Resources (OERs) began by introducing them as a “challenge” to HE, and a way to “widen participation in higher education”. Similarly a UNESCO-commissioned guide to OERs described them as “largely synonymous with... OpenCourseWare”, before repeating the OCW Consortium’s definition that the latter is “free and open digital publication of high quality university-level educational materials” (Kanwar, Uvalic-Trumbic, & Butcher, 2013).

Yet school-related OE projects are of equal, if not greater significance. User figures for the Khan Academy and the lesson-sharing site TES Connect (set up by the magazine where I work) appear larger than for many major HE OE sites.¹ At the time of writing, TES Connect was offering a similar or larger number of free individual educational resources to the total Apple could confirm were on iTunes U.²

That is not to understate the impact of OE in HE. One in four young people now enrolls in HE globally (UNESCO, 2009), and OE will no doubt play a crucial part in raising that proportion.

However, OE has an arguably more important role in schools, particularly in helping countries that are still struggling to meet the Millennium Development Goal of giving every young person a primary education.

Another reason why it is a mistake to view OE use as a spectrum of formality is the risk of then treating it as a hierarchy, giving primacy to the most formal types of users. We should not assume the fact a person undertakes a full course in, say, a piece of photo editing software, means the experience will have a greater impact on their work or worldview than insights from a single astronomy lecture. Neither may matter as much as a single resource that helps a child learn to read.

To see only those who take full formal courses as the “proper” users would be to side-line the vast bulk of the audience for OE. For the prime reason people use many of the most popular OE sources is not as an alternative to a university course, or even as a direct complement to their academic studies; it is for personal interest.

We might expect high numbers of casual users visiting iTunes U or TEDx to broaden their minds. Yet learning “for my own interest” was also the top motive given by visitors to the OCW Consortium, which offers access to material from more than 200 universities and educational institutions (OCW Consortium, 2012). A similar result was found by Tufts University in Massachusetts which got survey feedback from 1,026 users (OCW Consortium, 2012). “Personal learning” was the reason given by 37 per cent of users for using open courseware, more than twice the proportion who said they used it to complement a course being taken, and 10 times the proportion using it as a substitute for a course (see Figure 1).

¹ Explored in the “Reach and Scale” section of this chapter.

² Apple’s press office (email, December 7, 2012) would only confirm “500k+ free video and audio files”, while TES Connect that day listed 557,852 free resources; but Apple had quoted that same figure since January 2012, so its real total was likely to be larger.

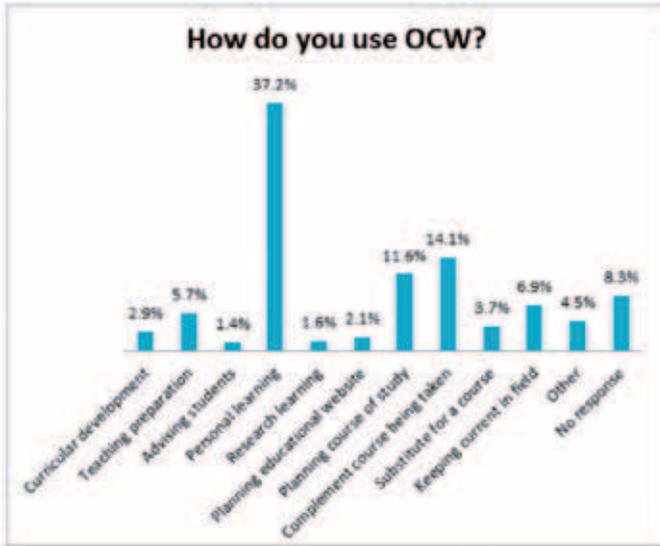


Figure 1 - Tufts University: OCW
Survey of 1,026 users, February
2011.

Users of the OCW Consortium and Tufts University site were also more likely to categorise themselves as “self-learners” than as undergraduates, postgraduates or any other group. This was also found in surveys on other related HE-focussed sites, such as Education-Portal.Com, then receiving four million visitors a month. “Self-learners” were its largest group of visitors (27 per cent) followed by “working professionals” (20 per cent). School pupils actually slightly outnumbered graduate students (9.3 per cent to 9 per cent), while the retired were only a small gap behind (7.5 per cent).

The popularity of open education with self-learners was noted from the launch of the first open courseware site by the Massachusetts Institute of Technology (MIT) in 2002. “Our biggest surprise was the number of independent learners”, Steve Carson, external relations director for MIT OpenCourseWare (OCW), told USA Today. “It demonstrates the unsatisfied hunger for learning that’s out there” (MacDonald, 2008).

The fact users describes themselves as self-learners – or indeed school pupil or retired – does not mean we should presume that, as individuals, they are any less likely to want to complete a full, formal course. But the low proportions who say they are driven to use the material as a substitute for a course, or as a complement to one, shows it would be wrong to assume resources must be part of a course to be of interest or significance.

2 Some of the key Open Education projects in Higher Education

MIT’s OCW project is normally credited as the trailblazer of OE in HE. The university announced it would be providing lecture notes, lectures, syllabuses and other material to the public for free in 2001, a year before the phrase “open educational resource” was coined. In its first month it gained 300,000 visits, and by the end of 2012 its monthly visitors had reached 1.9 million (MIT press release, 2012b).

Other universities in the US, Japan and Europe followed suit, many joining the OCW Consortium formed in 2005. It has 196 HE institution members, and a further 53 other linked institutions and consortia, and provides access to a directory of 5,910 courses (OCW Consortium, 2013).

The courseware provider that has reached the largest audience, however, is likely to have been iTunes U. Since its launch by Apple in 2007, initially with material from Stanford University, it has expanded to include material from 1,000 institutions, and more than 700 million downloads have been made from its library of more than 500,000 free lectures, videos, books and other resources.³

Universities have, however, only tended to put part of their material on there. So a visitor searching for MIT courses would only find four of them on iTunes U, but 2,150 via the MIT's OCW site, the OCW Consortium portal and other mirror sites.

Universities have also suggested they can see the Apple initiative as a promotional opportunity and a home to a more casual audience. Carolyn Culver, head of strategic communications at Oxford University, told the Times Higher Education (THE) magazine that the institution had taken this into account when selecting material for iTunes U (Attwood, 2009). "What it isn't designed to be is a substitute for undergraduate education, which it is commonly misinterpreted as", she said. "We are trying to pick things that are of interest to a wider audience."

Those seeking free academic books, journals and other can also visit sites such as Connexions, which grew out of a project started by Rice University in 1999.

What OCW does not normally offer, however, is accreditation. For the many users who use OERs informally, and do not see such free material as a substitute for traditional courses, this is not a problem. Yet others do demand it; a poll of Utah residents, for example, found the fact that there was "no certificate or degree awarded" was one of the greatest disincentives for using OCW material (Arendt & Shelton, 2009).

Partly in response to this demand, we have seen the rise of the Massive Open Online Courses (MOOCs). These are designed to be taken as full courses, normally as part of a cohort of students, and often offer a form of certification or accreditation. However, while the courses themselves are normally free – with exceptions such as the University of the People, which charges an application fee of \$10 to \$50 – assessment often requires a charge.

Prime examples of these include Udacity and Coursera, both developed by Stanford University professors. Udacity currently offers a choice of 15 courses and students are set tasks as they take the courses that are then assessed electronically. Students who finish one of the courses are emailed a free certificate of completion, signed by the instructors, indicating their level of achievement.

Since August 2012, students of Udacity's introduction to computer science course have also had the option of paying \$89 to take a 75-minute invigilated final exam at one of a range of test centres worldwide, as a "pathway for students who need to take proctored exams to receive credit from employers, universities, and schools" (Udacity, 2012). Udacity is also developing a third option, "a secured online examination that will be less expensive than the in-person exam".

MIT has also gone down the MOOC route, launching MITx in 2011. This, it explained, would differ from the OCW model it had created a decade before because it would provide "the opportunity for able learners to gain certification of mastery of MIT material" (MIT, 2011). Harvard added its own courses to the project the following year, and the joint platform, which has since attracted other institutions, was branded edX.

"Unlike its antecedent, open courseware — usually written materials or videotapes of lectures that make you feel as if you're spying on a class from the back of the room — the MOOC is a full

³ Apple press office email (December 7, 2012) citing figures from January 19, 2012.

course made with you in mind," The New York Times wrote (Pappano, 2012). "Videos pause perhaps twice for a quiz to make sure you understand the material or, in computer programming, to let you write code. Feedback is electronic. Teaching assistants may monitor discussion boards. There may be homework and a final exam" (Pappano, 2012).

The largest OE initiatives have been made possible by the year-on-year advances that have taken place in the content that it is now possible to deliver over the internet.

However - so far - they do not seem to have pioneered radically new types of technology themselves. File-sharing sites existed before MIT OCW and Connexions; podcasts, video casts, and video and audio streaming were popular before iTunes U and Coursera.

Where such projects may be becoming more innovative technologically is in the development of tools and systems for assessment and self-assessment (explored in greater detail in Chapter 4). The team behind edX have become increasingly aware of the desire students have for instant electronic feedback. They have also begun incorporating more elements from the gaming world, with students receiving "karma" points for assisting other students (MIT, 2012a).

Meanwhile Saylor.org, which features 272 courses, provides electronic portfolios to track its students' progress, arguing that these could give employers a better picture of an applicant's skills than a degree classification. It is also working with two providers of paid-for online courses to offer paid-for, but recognised, qualifications, as well as looking at more informal types of accreditation such as the badges system being developed by Mozilla.

This badges system is already being pioneered by the Peer to Peer University (P2PU), which describes them as a "lightweight engaging way to recognise learning" (P2PU, 2013). The project, started in 2009 with funding from the Hewlett Foundation and the Shuttleworth Foundation, differs from many of the other MOOC-type schemes by offering learning that is based around completing challenges set by peers, instead of an institution. Users then work to tackle those challenges, often by getting support from other peers, who have attempted to them as well.

3 Some key school-related Open Education projects

MOOCs are not only the domain of HE. In November 2012, the first high school OE project went live, a free course set up by the University of Miami Global Academy preparing pupils for the SAT subject test in biology (University of Miami, 2012).

But the largest school-related OE initiatives have been providers of free classroom OERs. Popular ones include Lesson Planet, Curriki, and Better Lesson, all based in the US. However, the biggest of this type of site - measured by total free resources at the start of 2013 - is the UK's TES Connect.

3.1 TES Connect

TES Connect is unusual as it was started, not by a charitable foundation, but by a private company that publishes a traditional print magazine. It also began almost by accident.

The TES site was originally set up in 1997 to accompany the Times Educational Supplement, a weekly publication for teachers in Britain that began as a newspaper in 1910. But the website's focus changed radically in 2006 when it began allowing teachers to upload and download resources for free.

The website had already established a popular set of discussion forums in the late 1990s, which attracted thousands of teachers to share ideas and chat. In 2005 staff on the web-team reported that increasing numbers of teachers were offering to share materials over email that they had created for successful lessons, such as worksheets and PowerPoint presentations. This

resulted in several teachers posting their own email addresses in public discussions on the site, and some getting multiple requests to send out the same email attachments.

To make this sharing of resources easier - and to help teachers avoid putting personal email addresses in the public domain - the web-team suggested a file sharing section could be added to the site, where teachers could upload and download material for free.

After its launch in 2006, the free “Resources Bank” swiftly became the most popular part of the site. Tools were provided so teachers could rate resources and comment on them, and additional social network-style functionality was added when the site was relaunched as TES Connect in 2008.

Four years later, and the site featured more than 560,000 free resources and received up to 3.6 million unique monthly visitors (ABC, 2012). In a peak month that year, seven resources were downloaded every second.

Although it is owned by a private company, the team working on TES Connect realised they could not charge teachers for material created freely by other teachers. So a pledge is promoted on the site that it will “always be free to join and share”.

Even though TES Connect has a global reach, with teachers uploading and downloading materials in 200 countries, the site’s owners TSL have since set up more country-specific portals. The first of these, ShareMyLesson, was set up for teachers in the US in partnership with a trade union, the American Federation of Teachers, which was keen to demonstrate the constructive role teachers were playing in education (Armario, 2011). Further portals have been established for India and Australia.

The types of resources on TES Connect vary, and include a mix of documents such as Word files and PDFs featuring lesson plans and worksheets, as well as presentations for whiteboards and videos.

The generous sharing of material between school-related sites echoes the partnerships seen between universities, such as on edX and the OCW Consortium. While around 70 per cent of the resources on TES Connect site are user-created, the rest have been produced by partner organisations including the Royal Shakespeare Company and the BBC.

One of these partners is a major provider of OE materials in its own right: the Khan Academy, which has uploaded all 3,415 of its videos to TES Connect.

3.2 Khan Academy

The Khan Academy is probably the highest-profile provider of material for school-age students. It was set up by Salman Khan, an American former hedge-fund manager, who was inspired by his experiences giving his 13-year-old niece maths tuition online.

When he started this tuition in 2004, he would talk on the phone to her while writing equations live in the drawing window of Yahoo Messenger (Thompson, 2011). But she explained that she preferred the pre-recorded videos he sometimes made on his computer, in which he drew on the screen in Microsoft Paint.

When he went on to teach his other cousins, he developed tools to assess their understanding and allow them to drill through questions, programming test modules in Java.

Khan’s story is another case that illustrates how the delivery of content in OE has often relied on pre-existing forms of mainstream technology, while assessment has required greater innovation.

Today the Khan Academy is backed by Bill Gates, and provides videos on a broad range of topics including the sciences and humanities, even if the bulk of material is still centred on mathematics for K-12 students.⁴

⁴ www.khanacademy.org/ Retrieved on December 17, 2012.

What separates the Khan Academy from the simpler OER sites for schools is its tools for assessment. It is also a site that encourages direct use by learners and teachers, though the two use it in different ways, as teachers are provided with tools designed to give them summaries of the performance of their whole class and to analyse the strengths and weaknesses of individuals.

Such tools will prove particularly useful in countries where every child has individual access to a computer at school or at home, or a personal portable device.

In poorer developing countries this will not be an option for many students for a long time to come. However, there are other ways that OE resources are already having an impact in them on schools, a prime example being the TESSA project.

3.3 TESSA

The Teacher Education in sub-Saharan Africa (TESSA) programme was set up by the Open University in 2005 as a partnership scheme working with teacher-training institutions in countries including Nigeria, South Africa, and Tanzania. It has since expanded to provide 20 programmes in more than 12 countries and estimated by 2008 that its materials were assisting in the training of more than 400,000 teachers (Wolfenden, 2008).

Freda Wolfenden, who became director of the project in 2008, said providing better training for teachers was crucial in a region where half had few or no qualifications. "When we look at the quality of learning in sub-Saharan Africa, we find a lot of it that's poor," she said. "We find lots of accounts of children who have been to school for three or four years and still find it very difficult to read their own name" (Shaw, 2011). However, Wolfenden continues teachers could not be taken away from their schools for training. "It might be one teacher per 100 pupils, so you can't take them away as that will leave children without access to any teachers whatsoever" (Shaw, 2011).

The programme focuses on providing activities that teachers can use with their pupils in the classroom, but which simultaneously help train teachers to provide a more engaging and effective education. It has created 75 flexible study units, covering areas such as literacy, numeracy and science. The African institutions have adapted them to suit their local educational needs and translated them into languages including Swahili, French and Arabic.

All the materials can be downloaded from the TESSA website (www.tessafrica.net) as PDFs and Word files, allowing teachers to share and republish them in a variety of ways.

An evaluation of the scheme by Kenya's Egerton University found that teachers felt it had made their jobs more interesting and exciting (Wamutitu et al., 2011).

4 Reach and Scale

Comparing the reach and scale of the different OE projects for schools and universities is a tricky and, arguably, silly exercise. Partly this is because there is such a range of projects, and because they record and publish data in different ways and have different expectations of their users, and different levels of engagement. Popularity is also not proof of quality, significance or engagement. Those heavy caveats should be taken into account when looking at the figures the different projects highlight.

The Free Technology Academy, for example, has succeeded where many better-known MOOCs have so far failed, as it has been set up so its certificates count towards master's degree courses at universities in Spain, the Netherlands and Norway. Yet, in its first three years it only had a total of around 300 students, with numbers falling after its first year when the courses were less subsidised by EC funding (see case study panel for more details⁵).

The University of the People reported it had enrolled 1,100 students in its first two years

(Marcus, 2012), while openEd 2.0⁶ had 1,452 total users.

In contrast, P2PU cited 30,000 individual users, and Udacity saw 90,000 on its first two courses (and 160,000 on a course on artificial intelligence that was a predecessor to the project) (P2PU, 2013; Lewin, 2012). The Saylor Foundation recorded 350,000 subscribers (which is not the same as course-taking students) while edX saw 370,000 students enrolled in its courses in autumn 2012 (Saylor.org, 2012; Pappano, 2012). Coursera, meanwhile, has seen more than 2 million “Courserians”, all registered users, though it said it could not specify how many of those had started courses.⁷

TES Connect had 2.3 million registered users, the vast majority of which are teachers.⁸ It also recorded 61 million page views a month and 3.6 million monthly visitors (ABC, 2012). The Khan Academy recorded a slightly smaller number of monthly page views, at 58 million but a larger number of unique monthly visitors at 5.7 million (Khan Academy, 2012).

Apple would not provide comparable figures, but noted that 14 million had downloaded its iTunes U app and it had seen a total of 700 million downloads since the project’s launch.

One of the many reasons such comparisons are unfair and potentially misleading is that some of the projects are not possible to scale up “for free”, while others are. In the cases of the Free Technology Academy, UoP and openEd 2.0, each focussed on providing guaranteed, close individual learner support from qualified and credible HE educators, so could not expand user numbers in the manner of several of the other projects.

Basic figures from the global traffic-ranking website Alexa can give a further idea of popularity, at least for the organisation’s websites. Such figures are, again, blunt and problematic because they are based on a toolbar only downloaded by some web-users. They also do not distinguish iTunes U from the rest of the content offered on Apple’s website or MIT OCW from the rest of MIT’s material. After those two organisations (ranked 35th and 1,354th), the web addresses for other projects mentioned in this chapter were, in order of their Alexa global traffic rankings: Coursera (3,187); Khan Academy (3,249); edX (8,304); Udacity (11,436); TES Connect (14,052); Lesson Planet (44,573); Open Learn (of the Open University) (50,239); Curriki (87,644); Saylor.org (104,355); University of the People (137,720); Better Lesson (139,385); P2PU (161,100); OCW Consortium (199,301); Free Technology Academy (594,320); and TESSA (2,588,528).⁹

There is, of course, a major difference in engagement between a learner who enrolls in a full HE course online and a teacher who registers, perhaps only to download a single teaching resource for one lesson. But school resources differ in terms of reach because the downloader often is not the end-user or learner. For every teacher downloading material and using it in lessons, the reach is multiplied by their number of students – which can be in the hundreds if they teach at secondary level or in a developing country. If the material is being obtained to train teachers, the knock-on impact will be even greater. So while TESSA recorded in 2010 that more than 700 teacher educators in sub-Saharan Africa were participating in the program, it estimated 40,000 teachers were benefiting from the material (Shaw, 2011). Had it chosen to estimate the number of school pupils who had been taught a lesson based on TESSA materials, the figure would, no doubt, have been in the tens of millions.

TES was keen to gauge the impact of its resources, so launched a survey of users in autumn 2012 which received responses from more 254,000 teachers.¹⁰ Based on their estimates, TES Connect content reaches 41 million pupils.

⁵ Email response from Wouter Tebbens of FTA, December 19, 2012

⁶ Statistics provided by the project managers Andreas Meiszner, nd.

⁷ Front page ticker on <https://www.coursera.org/>, visited December 2012

⁸ Front page ticker on <http://www.tes.co.uk>, visited December 2012

⁹ Rankings obtained from Alexa, December 2012, <http://www.alexa.com/>

¹⁰ TES Research survey, December 2012

5 The role of brands

Brand clearly plays a role in the popularity of OE sites, with those that are built on a pre-existing global brand gaining a boost. It is striking that the three universities that seem to have had the greatest success in OE – MIT, Stanford and Harvard – also all rank in the top five in the world in THE magazine's 2012 international rankings of 400 universities (THE, 2013).

Even if you live in another country, if you are an ambitious school-leaver you are likely to be aware of such institutions. An 18-year-old student in Brazil, whose blog is highlighted on the edX site, wrote that his first reaction on hearing about MITx was “A course with certification from MIT? Sounds like a challenge!” (Amaral, 2012).

Oxford University, also in the THE's top five, has proven one of the most popular institutions on iTunes U, with 19 million downloads.¹¹ The success of iTunes U must in turn be partly down to being built on the iTunes brand, first launched in 2001, and the even greater Apple brand. Similarly, the initial success of TES Connect was built on the existing popularity of a set of teacher forums, set up by the long-running Times Educational Supplement, a publication sometimes referred to by other British media as “the teachers' bible”. One of the only other providers of learning material in the UK to see comparable hits is the learning site of the BBC,¹² another long-established institution with a powerful brand.

But brand is not everything. Oxford's iTunes U downloads start to look meagre when compared to those of the Open University, which had recorded more than 59 million.¹³

Birmingham City University - which does not even appear in the THE's top 400 universities for Europe - also appears to have punched above its weight. Oliver Williams, head of the university's Screen Media Lab, noted that lectures from the university had appeared in the iTunes U top 30 (Attwood, 2009). “Neither The Open University nor Birmingham City University is a global household name in the same way as Harvard, Oxford or Cambridge” he told THE. “It's a cliché to say that content is king, but I believe the download patterns via iTunes U prove that cliché. People seem to download content that they want to consume rather than just because it comes from an institution with a world-beating reputation.”

Of course, once sites gain popularity they can grow into brands in their own right. The Khan Academy would be an example here - though its true success happened after it began receiving support from the man behind of the world's biggest technology brands, Bill Gates.

6 Real Open Education - or just closed education for free?

A key accusation made against OER sites is that while they provide material for free they do not actually lead to OE. Indeed, some have been attacked for furthering “closed” models of teaching and traditional pedagogies. Khan Academy has been accused of promoting an updated form of rote learning, and creating “joyless test-prep factories” for “drilling and killing” (Thompson, 2011).

However, Khan disagrees, stressing the way Khan Academy materials have been used to break away from old patterns of teaching, by “flipping” learning. This means that pupils can study the material as self-learners at their own place, freeing up time when they then return to the classroom for their teachers to work with them on more engaging projects and “deep interactive experiences”. Khan believes his project is helping teachers to break away from what he calls “Prussian model” schooling, the traditional orthodoxy of set timetables, subjects, behavioural codes and teaching styles. He argues that this top-down approach has been to blame for “stifling deeper inquiry and independent thought” (Khan, 2012).

Similarly, the TESSA project aims to give African teachers the tools to offer less didactic forms of teaching, making lessons more of an active experience for pupils. “We have reports of pupils

¹¹ October 2012 statistics, published on <http://itunes.ox.ac.uk/>, retrieved December 2012

¹² Hitwise data, December 2012

¹³ Recorded December 2012, on: <http://projects.kmi.open.ac.uk/itunesu/impact/>

turning up to school more because it's more exciting," Ms Wolfenden said (Shaw, 2011).

How open the education is that a teacher creates from free online materials is, of course, largely up to the teachers themselves and the policies of their schools. On TES Connect, the most popular individual resource, downloaded 290,750 times, is "Murder Mystery", a set of materials for teachers that allow them to set pupils the challenge of solving a murder by uncovering clues from a series of puzzles that require subtle elements of maths.¹⁴ As a resource that encourages team-work, inquiry and problem-solving it seems counter to traditional, didactic forms of teaching. However, the extent to which any resource promotes "open" or "closed" education is open to debate. Other resources in the TES Connect top 10 include posters featuring maths definitions, a collection of "starter" activities for lessons, and a guide with "50 ideas for meeting your new class". The sixth most popular is an introduction for teachers in England to the 2012 national school inspection framework, potentially emblematic of top-down control.

Yet, signs of a top-down model are arguably in greater evidence on the HE MOOCs. These after all, still often tend to offer a "broadcast" form of education, with select experts delivering material down to the students. The exceptions are those MOOCs specifically built around a "connectivist" approach, in which peers learn together by making connections between each other. George Siemens, a proponent of this approach, has suggested that these should be branded "cMOOCs", while those that offer more traditional institution-backed forms of HE teaching – such as edX and Coursera– would be branded a "xMOOC" (Siemens, 2012). "The Coursera model emphasizes a more traditional learning approach through video presentations and short quizzes and testing", he writes. "Put another way, cMOOCs focus on knowledge creation and generation whereas xMOOCs focus on knowledge duplication".

If the "c" for connectivist label was available for school-related OE, then, at a stretch, it might be applicable to TES Connect. It is, after all, built on content created by teachers for their peers, which is shared and improved through online discussion, and adapted. Teachers themselves learn through this process and are actively encouraged to adapt and remix material on the site to make it suitable for their own classrooms. The project does clearly fit the "4 Rs" of Open Education set out by Wiley (2010), as it allows "Re-use", "Redistribution", "Revision", and "Remixing". In contrast, these activities are not always directly possible with lecturer's material contained within xMOOCs or iTunes U. It is also the users of TES Connect who rate the content, allowing the most useful material to rise to the top.

The dominance of the community over expert instructors do make projects such as P2PU and TES Connect look more similar to each other than they do to Coursera, edX and Khan Academy. However, the division is not really a black and white one. MOOCs, such as those found on edX, Coursera and Udacity, increasingly enable students to connect with others to assess each other's work and encourage them to support each other's learning, including with systems such as MITx's "karma" points. The Free Technology Academy, meanwhile, plans to switch entirely to what it calls "enhanced peer learning".¹⁵

Many such approaches are at a relatively early stage. There are also many other potential approaches to MOOCs that do not yet appear to have been tried, though we may see them shortly.

For example, there is little sign yet of students who are enrolled in a traditional university learning alongside online-only students as part of the same MOOC cohort.

Universities appear keen to stress that the experience of students on campus will be different to those same it offers fully-online learners, even if they both end up using some material and assessment tools from the same MOOCs. MIT notes that it "believes firmly in the residential model of education" and that the online tools of MITx will "benefit the educational experience of residential

¹⁴ TES Resources weekly internal report, December 6, 2012

¹⁵ Email response from Wouter Tebbens of FTA, December 19, 2012

students [by] supplementing and reinforcing the classroom and laboratory experiences” and help lecturers by automating “some of the more repetitive and less creative tasks, such as grading, thereby liberating more time to devote to innovative ways of teaching the material and to additional contact time with resident students” (MIT, 2011).

In the future we might see less of a division between online and campus learners, as well as between different institutions, with students from different universities studying some of the same courses together, even if their institutions have different subscription and fee models.

7 Evidence of impact

The user figures for many of the OE projects mentioned are, in themselves, signs of success. Encouragingly, the main universities involved do not, so far, seem to have witnessed a drop-off in students willing to pay for traditional courses. So their OE projects have expanded access to education, instead of cannibalising existing demand.

The Open University might have seemed at greater threat when it began offering free material on iTunes U and its own Open Learn Portal, because it principally offers a form of distance learning. Yet it saw its fee income rise between 2010 and 2011, partly because of an increase in full-time students on its paid-for courses (OU, 2011).

Drop-out rates on MOOCs can be high, however. One Udacity student reported that less than a third of students who signed up to the computer science course he studied completed the first homework assignment, while only one in 10 completed the course. “The rigour quickly weeded out the dilettantes”, he wrote (Redmon, 2012). Coursera estimates that around 30 per cent of those who complete the first assignment will finish the course.¹⁶

Yet user feedback to the OE projects has tended to be positive. Polling by MIT of its OCW site’s users show that 96 per cent of users would recommend it to others and 80 per cent rate its impact as positive or extremely positive (MIT OCW, 2012). Fundação Getulio Vargas (FGV), the first Brazilian educational institute to join the OCW Consortium, said its polling showed that 99 per cent of students had their expectations met after finishing one of its courses and all would recommend them (OCW Consortium, 2012).

Similarly, user polls for TES Connect have found that 97 per cent of teachers believe that TES resources are effective or very effective in delivering their lessons. A 2009 UK government report noted that figure and estimates that, by the following academic year, the site would have saved schools in Britain up to £1 billion in teaching time, the equivalent of adding 30,000 full-time teachers (Treasury, 2009).

The impact that online OE projects have directly on learners’ education is harder to judge, especially at this relatively early stage. Past research indicates that those who learn online can have small advantage over those who learn only in a traditional classroom with face-to-face teaching.

A meta-analysis for the US Department for Education in 2010 of 50 studies, most involving older learners, found that “students in online conditions performed modestly better, on average, than those learning the same material through traditional face-to-face instruction” (Means, Toyama, Murphy, Bakia, & Jones, 2010). However, it found that the effect sizes were statistically equivalent.

Students had a far more significant advantage if they received a mix of both face-to-face and online education, rather than just one or the other. This, it noted, may have been down to reasons other than simply the technology itself - students may have received different types of teaching or learned for longer. But the fact learners could “expand” their learning more easily with blended learning was itself part of the advantage. This bodes well for projects such as Khan Academy

¹⁶ Email from Iz Conroy of Coursera, December 18, 2012

which promote blended learning in schools, and for universities such as MIT which is exploring how it can make its campus courses provide the best mix of online and face-to-face instruction. Results were also better for online learning if they were “collaborative or instructor-directed than in those studies where online learners worked independently”, suggesting that students may learn better with MOOCs than if left to their own devices with OCW.

8 Beyond institution-led Open Education

The brief for this chapter was to focus on particular OE projects, most of which have been set up with backing from major institutions. But arguably the most exciting aspect of the surge of OE that has been unleashed by the internet is the part played by learners and teachers, rather than institutions.

These people will use the platforms created by others – whether they are Twitter, Facebook or TES Connect – to share and to learn for themselves. Instead of waiting to be sent on a professional development course, teachers can learn from their “Professional Learning Network” – often peers they know online – or join in conversations on Twitter, such as the weekly #edchat. In the UK, online connections have also led to offline events known as TeachMeets, a form of “unconference” where teachers meet in schools, or even in pubs, to share approaches they have found to work in the classroom by giving short, punchy presentations (Exley, 2011).

Stephen Heppell, founder of NotSchool.net, summed this up in a discussion paper presented to European education ministers:

Schools are running ahead of policy and the literature, and within them innovative teachers, old and young, are running ahead of their schools and in some enlightened, indeed exhilarating, cases, the students are running ahead of even the innovative teachers. The model has inverted; co-construction of better learning is happening all around us, student-led innovation, teachers’ peer to peer exchange of effective practice is happening from the ground up. This is not quite a pedagogic Arab Spring, but it does feel like substantial and substantive change from below (Heppell, 2012).

Not every pupil or teacher is a trailblazer or revolutionary, as Professor Heppell acknowledges. But the innovative ones are showing that national education systems and the major educational institutions have only just started to scratch the surface of Open Education. They also show that true Open Education, in practice, will not involve learners simply acting as passive consumers of content, but as creators, sharers and supporters of others’ learning. The same will be true of their teachers.

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Biographies of Contributors

Andreas Meiszner (Editor)

Dr. Andreas Meiszner is a current fellow at ELIG and affiliated researcher with UNU-MERIT. He also teaches and supervises doctoral students with the University of Liverpool, UK, and he is co-founder and managing partner of SCIO a research, capacity building and consultancy company that specializes in Knowledge, Innovation and Organizational projects in a varied number of fields from across Science, Technology and Sustainability. After an initial career path within the private industry and service sector, from 1995 through 2003, Andreas has been working in an academic scientific context as a project manager, researcher, consultant and trainer in the fields of economics, education, innovation, and information communication technologies. During this time he also had been working as a senior researcher and project manager with the United Nations University UNU-MERIT, NL. He has been one of the early scholars within the now fast growing Open Education field, researching and piloting since 2006 with open education models and looking at organizational, technological, legal, sustainability and pedagogical aspects.

Lin Squires (Editor)

Dr Lin Squires has more than 24 years of experience in IT and management which have increasingly moved her into the field of learning, development, competency and knowledge. For 10 years Lin worked on the development and implementation of IT solutions culminating in the role of CIO to a UK medical research organisation, followed by 13 years in technology and business consulting at PricewaterhouseCoopers (PwC). Initially as an advisor in the consulting group then in an internal role to develop and deliver PwC's strategic plans for knowledge, learning, skills development and thought leadership for the UK IT consulting practice. Part of the role involved the transition from traditional classroom-based workplace learning to a mixed toolset for the consulting group of traditional learning media, on-the-job training, peer learning, knowledge-based and new media supported learning. Prior to her experience in IT, learning and development Lin had a scientific career primarily as a Research Scientist at King's College, London University.

Richard Straub (Foreword)

After stepping down from his executive role in IBM by end of 2005 concluding a 32 years career in the company, Dr. Richard Straub has taken on a working portfolio at the intersection of Academia and business. This includes the roles of the Director of Development at the European Foundation for Management Development (EFMD), Secretary General of the European Learning Industry Group (ELIG) and Senior Advisor to the Chairman IBM Europe, Middle-East and Africa. In preparation of the Centenary Peter Drucker Forum to be held in Vienna in November 2009 he established the Peter Drucker Society of Austria of which he is currently the President.

In the course of his international IBM career Richard Straub held various executive line and staff positions in IBM such as Assistant General Manager PC Marketing for IBM Europe based in Paris, global Chief Learning Officer based in the US and Director of Learning Solutions for Europe, Middle-East and Africa.

For the last 10 years he has been increasingly involved in European Union level industry initiatives in the area of skills, lifelong learning and innovation as Chair of the European Career Space Consortium (ICT skills and new University curricula required for the 21st Century Economy), the Living Labs Policy Group and the Open Innovation Strategy Group.

Bart Verspagen (Foreword)

Dr. Bart Verspagen is Director of UNU-MERIT and Director-Dean of the Maastricht Graduate School of Governance (MGSoG) at Maastricht University. Bart Verspagen is an economist specialised in the economics of technological change. He did his undergraduate studies at the University of Limburg (now called Maastricht University) in Maastricht, the Netherlands, from 1984–1988. After that, he obtained a PhD degree from the same university in 1992. During the five years after that, he held a scholarship from the Royal Netherlands Academy of Arts and Sciences (KNAW). His workplace is the Economics Department of Maastricht University, as well as the research institute UNU-Merit in Maastricht. At the university, he holds the chair

of International Economics. Verspagen's research interests are fairly broad. The centre area is the process of economic growth, and its relation to technological change. This also brings him into areas such as international trade theory, industrial dynamics, economic and technology history, and applied econometrics, statistics and mathematical modelling. With regard to the latter, he has mainly been applying evolutionary theory to economics. This includes simulation modelling of international economies.

Elmar Husmann (Introduction & chapter 7 - Concluding Words)

An engineer and management scientist by training, Elmar Husmann has been in leadership roles for pwc and IBM strategy consulting and has extensive experiences in bringing new initiatives and ventures to life. He was involved in launching a large IBM research programme on next generation Internet Services involving IBM research labs from Haifa, Zurich, New York and Palo Alto. He has further consulted over many years with BMW and was closely involved in creating BMW Welt - a futuristic brand experience center with over 500 new staff.

Elmar has a strong passion for innovation topics in the domain of learning and education and is since 2007 involved with ELIG as Deputy Secretary General. He has led ELIG's engagement into several innovative initiatives including two Open Education pilots and the we.learn.it project on creativity and exploration for schools. Elmar is also a regular invited expert for the European Commission on initiatives in the domains of creativity, skills and technology enhanced learning.

Florence Rizzo (Introduction & chapter 7 - Concluding Words)

Florence Rizzo is a current ELIG fellow and the co-founder of SynLab, an independent organization with a mission to bring great and innovative ideas to life in the field of education (www.syn-lab.fr). SynLab promotes innovation in France and works as a citizen Research and Development body that mobilizes researchers, educators, private and public sector networks to co-create projects with a potential of systemic change. Previously, she worked with Ashoka, a global network of innovative Social Entrepreneurs and contributed to its launch in France, Belgium and Switzerland. She founded a training program called « Challenge IMPACT » in order to support Citizen Sector Organizations to scale up and generate more social impact. She was nominated in June 2011 at the French National Council for New technologies to lead a working group on e-education. She was also part of the team of a parliamentarian to handle a report to the French ministry of Research on the impact of new technologies on education. She holds a Master in Political Science and International Relations and a MBA from ESSEC Business School with a focus on social entrepreneurship.

Markus Deimann (chapter 1)

Dr. Markus Deimann, M.A., has been Research Assistant at the Department of Instructional Technology & Media, Prof. Dr. Bastiaens, at the FernUniversität in Hagen since May, 2006. He completed his studies of educational sciences and political sciences at the University of Mannheim with a Master's degree. After that he became Research Assistant in the BMBF-Project "Multimediales Fernstudium Medizinische Informatik (MEDIN)" at the University of Technology Ilmenau and at the University of Erfurt. Furthermore, for one year, he became a Visiting Scholar at the Florida State University, Tallahassee, USA. Since 2011 he is a Fellow of the OpenLearn Network at the Open University UK. Dr. Deimann works as a peer reviewer for several international journals (e.g. IRRODL) as well as for various international conferences.

Peter Sloep (chapter 1)

Dr. Sloep is full professor of Technology Enhanced Learning at the Open University of the Netherlands. His research encompasses such topics as networked learning (specifically but not exclusively for professionals), learning design, learning objects, standards for learning technologies, and open educational resources, as well as knowledge sharing and creative collaboration in communities and networks. Sloep is Honorary Professor at the Caledonian Academy of Glasgow Caledonian University. He has co-authored more than 100 peer-reviewed publications in scholarly journals and conference proceedings, and has authored or edited three books. Sloep is a frequent speaker at national and international conferences. He is the European Associate Editor for MOOCs Forum and frequently reviews papers for various journals and conferences in the TEL field.

Michael Shaw (chapter 2)

Michael is deputy editor of the TES (Times Educational Supplement), a weekly publication for teachers that started as a newspaper in 1910. He joined the UK-based TES as a news reporter in 2002, after working for the Bristol Evening Post newspaper and the TV channel Cartoon Network. This year he launched the TES's digital service for teachers, TES Pro - a paid-for set of tools designed to complement its free Open Educational Resource site TES Connect, which now has more than 2.5 million registered users around the world.

Ad Notten (chapter 3 & chapter 3 - case study 4)

Ad Notten received his MSc in Information Management from the University of Wales. Currently he is an Information Specialist and Researcher at UNU-MERIT, Maastricht University, The Netherlands. In his capacity as an information specialist he has gained considerable experience in information service management issues. Issues pertaining information service provision

to advanced and distance learning students have his special attention. Apart from this, he has also participated in several EC projects among which an ICT R&D evaluation project for DG CONNECT. He has presented at the Annual TechMining Conference, and has also published in the Journal of Technology Transfer and in Scientometrics.

Martin Rehm (chapter 3)

Martin Rehm (PhD) is the project manager e-Learning at the joint institute of the United Nations University - MERIT and the Maastricht Graduate School of Governance (MGSoG). In this context, he is responsible for acquiring and coordinating a variety of (blended) learning projects. External partners, for which Martin has worked, include the United Nations Children's Fund (UNICEF), the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) and the Russian Ministry for Economic Development. Martin Rehm is also a senior researcher at UNU-MERIT and MGSoG, focussing on online collaborative learning, web 2.0 for education, distribution of innovation within (learning) networks and Communities of Learning (within organizations).

Ruediger Glott (chapter 3)

Ruediger Glott is a group leader within the Collaborative Creativity Group (CCG). His research covers a number of fields that are related through a focus on open and co-creative innovation processes and strategies and is characterized by a combination of academic and industry-oriented approaches.

Petra Hagemann (chapter 3 - case study 1)

Petra Hagemann works as a project coordinator at PTB, the 'Physikalisch-Technische Bundesanstalt', where she implements technical cooperation projects with African countries. Until 2012 she stimulated human capacity building projects like ict@innovation at InWEnt - Capacity Building International, Germany. Petra has a strong belief in the power of open source and open education for open societies.

Balthas Seibold (chapter 3 - case study 1)

Balthas Seibold is a senior project manager for 'Global Knowledge Sharing & Learning' at GIZ, the 'Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH'. He focuses on open knowledge cooperation to foster the freedom to learn & innovate in developing countries. Balthas has a special interest in the knowledge commons and social networking and their potential to build human capacities, link up people and foster open learning worldwide. Before 2012 he led capacity building programmes with GIZ that promote the open source IT-sector in Asia and Africa such as ict@innovation. Balthas has also worked at InWEnt - Capacity Building International, UNESCO's bureau of strategic planning, the GTZ and the UNDP.

Lex Bijlsma (chapter 3 - case study 2)

Lex Bijlsma is Professor of Education and Software Construction, and Dean of the School of Computer Science at Open University of the Netherlands. He obtained a Ph.D. in mathematics from the University of Amsterdam in 1978, and has worked as a researcher and lecturer in both mathematics and computer science at the Institut des Hautes Etudes Scientifiques, Eindhoven University of Technology and Utrecht University. His research interests include program design methodologies, mathematical techniques in computer science, and software architecture.

Ioannis Stamelos (chapter 3 - case study 3)

Dr. Ioannis Stamelos is an Associate Professor at the Department of Informatics of the Aristotle University of Thessaloniki, where he carries out research and teaching in the area of software engineering. He holds a diploma of Electrical Engineering (1983) and a PhD in Computer Science by the Aristotle University of Thessaloniki (1988). His current research interests are focused on open source software engineering, software project management and software education. He has published more than 100 articles in international journals and conferences. He is/was the scientific coordinator or principal investigator for his University in over 20 research and development projects in Information & Communication Technologies with funding from national and international organizations.

Pantelis M. Papadopoulos (chapter 3 - case study 3)

Dr. Pantelis M. Papadopoulos is an adjunct research at United Nations University - International Institute for Software Technology, in Macau SAR, China. His research focuses on educational technology and the integration of software tools in learning. His work is heavily influenced by social constructivism, focusing primarily on computer-supported collaboration learning and peer interaction. As a member of the PPAeL project in Macau, he works on collaboration patterns emerging in the loosely structured, ad hoc communities of open-source software. He also holds a position as a postdoctoral research associate at Carnegie Mellon University in Qatar, where he is working on designing and developing collaborative learning activities for multi-touch, multi-user tabletop systems in the ALADDIN project. He holds a Diploma in Informatics, and a M.Sc. and a Ph.D. in Information and Communication Technologies in Education from Aristotle University of Thessaloniki. He has published more than 30 papers in international journals and conferences.

Anthony F. Camilleri (chapter 4)

Anthony F. Camilleri is engaged with EFQUEL in the position of Quality Services Manager. As part of his portfolio he manages a set of quality certifications for e-learning including UNIQUE (<http://unique.efquel.org>) for HEIs and ECBCheck (<http://ecb->

check.efquel.org) for programmes. He has been investigating the linkages between higher education, innovation, quality and open education for the last three years, and in particular has been involved with the Open Education Quality Initiative – OPAL and the OERTest Initiative, where he proposed a learning passport model for recognition of credit gained through open learning. He currently coordinates the VM-PASS project which is attempting to facilitate recognition of open and non-traditional qualifications across Europe. Mr. Camilleri has also been active as a QA Reviewer and trainer of QA reviewers around Europe, for a number of different QA institutions in Higher Education.

Anne-Christin Tannhäuser (chapter 4)

Anne-Christin Tannhäuser works as project manager for the “European Foundation for Quality in E-learning (EFQUEL)” and at the “Information Systems for Productions and Operations Management” department, University of Duisburg-Essen. She coordinates the “International Journal for Innovation and Quality in Learning (INNOQUAL)”. For the past 5 years, starting in 2008 Anne, has been involved in several initiatives in the field of open education, innovation and new technologies at national and European level; first for the University of Iceland and later for a non-profit research center in Italy. In multilateral research endeavors she coordinated evaluation activities, the communication of research results and overall management. Anne earned a Master degree in Educational Sciences and Linguistics from the University of Leipzig in 2007. She was trained at the Max Planck-Institute for Human Development, Berlin, in the use of qualitative and quantitative research methodologies.

Pascale Hardy (chapter 5)

Dr. Pascale Hardy is the Academic Director of University of Liverpool/Laureate DBA Programme. She also supervises doctoral students in the DBA and PhD programs at Grenoble School of Management and Walden University. Dr. Hardy has extensive academic experience in US and European Universities through various senior academic roles and has played a leading role in a number of international research projects. Dr. Hardy has authored a number of books & book chapters in the areas of Knowledge Management, Open Education and E-learning and her work has appeared in Computers & Education, E-learning and Digital Media as well as presented in prestigious conferences mainly in the area of E-learning and Innovation. Further, Dr. Hardy has acted as an advisor to the UN on using e-learning and knowledge management strategies to build developing countries’ capacity in climate change negotiations. Dr. Hardy holds a Ph.D in Social Sciences from Università Gregoriana, Italy and an MBA from Open University Business School, UK. Her research interests include strategic analysis of ICTs and learning development, knowledge creation and management, open innovation, eLearning, knowledge transfer, organizational learning and capabilities and change management.

Dominique Lelievre (chapter 5)

Dr. Dominique Lelièvre is Lecturer in Management at the University of Liverpool Management School (ULMS) where she has been responsible for a number of online programmes. She is currently the Director of Studies for the MSc in Global HRM. Dominique is a graduate from the Sorbonne University and she holds an MBA and a PhD from the University of Manchester. She has acquired substantial work experience in the service sector prior to moving to academia where she has been involved for more than a decade with distance learning and online education for leading institutions in the UK (Open University, University of Liverpool). Her main research interests are concerned with the governance and dynamics of partnerships, and open education.

Evangelia Katsikea (chapter 5)

Dr. Evangelia Katsikea is an Assistant Professor of Marketing at the Department of Marketing and Communication of the Athens University of Economics and Business, Greece. She received her PhD from Cardiff University, UK. Her research interests focus on export sales management, international marketing strategy, open innovation and tourism marketing. Her work has appeared in Journal of World Business, Journal of the Academy of Marketing Science, Journal of Business Research, European Journal of Marketing, Journal of International Marketing, International Business Review, International Marketing Review and Industrial Marketing Management, among others.

Andy Lane (chapter 6)

Professor Andy Lane has been at The Open University in the UK since 1983 and held various offices including being Dean of the former Technology Faculty from 2000-06. Andy was Director of The Open University’s OpenLearn Initiative from 2006-09 (www.open.ac.uk/openlearn); served as a Board member of the OpenCourseWare Consortium from 2008-10; been involved in a number of European OER initiatives such as MORIL (<http://moril.eadtu.eu/>) and OER-HE (<http://www.eadtu.nl/oerhe/>); was the Senior Fellow in the Support Centre for Open Resources in Education at the OU (<http://www8.open.ac.uk/score/>) from 2009-12; and also lead the JISC funded SusTEACH project (<http://www.open.ac.uk/blogs/susteach/>) investigating the carbon impacts of HE teaching models. Andy has authored or co-authored many teaching texts, research papers and other publications dealing with systems thinking and environmental management; the use of diagramming to aid systems thinking and learning; and systems of open education, especially the use of open educational resources.

Chris Dede (chapter 7 - commentary 1)

Chris Dede is the Timothy E. Wirth Professor in Learning Technologies at Harvard's Graduate School of Education. His fields of scholarship include emerging technologies, policy, and leadership. His funded research includes five grants from NSF and the Gates Foundation to design and study immersive simulations, transformed social interactions, and online professional development. In 2007, he was honored by Harvard University as an outstanding teacher, and in 2011 he was named a Fellow of the American Educational Research Association. Chris has served as a member of the National Academy of Sciences Committee on Foundations of Educational and Psychological Assessment and a member of the 2010 National Educational Technology Plan Technical Working Group. His latest co-edited book, *Digital Teaching Platforms*, was published by Teachers College Press in 2012.

Jeanne C Meister (chapter 7 - commentary 2)

Jeanne C Meister is a best selling author, internationally recognized consultant and keynote speaker. Jeanne is Partner of Future Workplace LLC, (www.futureworkplace.com) a firm that provides executive education to assist organization in building the skills & capabilities needed for success in the workplace of the future. Jeanne is the best selling author of three books, two of these books are on the launch and globalization of corporate universities and her latest book is entitled: *The 2020 Workplace: How Innovative Companies Attract, Develop & Keep Tomorrow's Employees Today* (Harper Collins).

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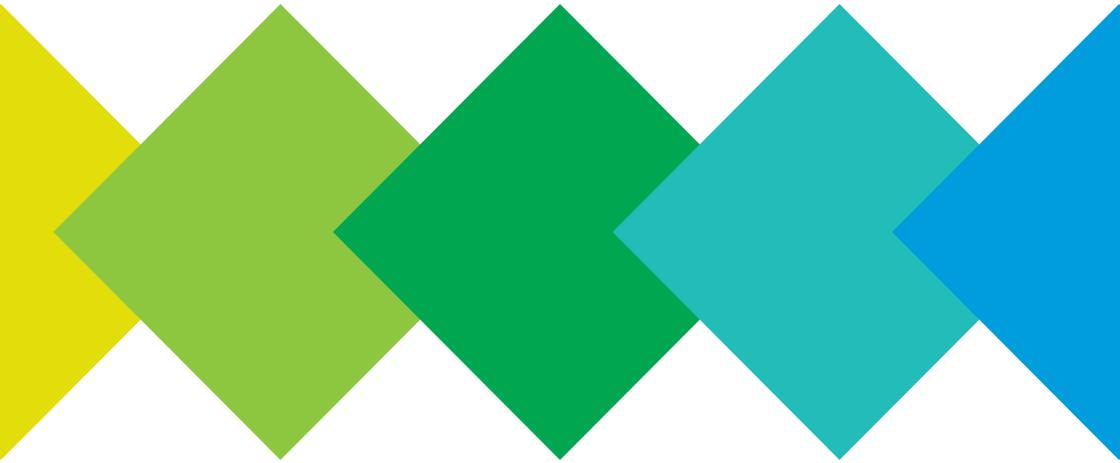
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This volume takes a look at the emergence of open education as a concept, a production process and a delivery preference in the world of education and learning.

Drawing on early lessons from around the globe the book lays out how formal education, workplace learning and lifelong learning have been impacted so far by open education and how they stand to be further impacted by a landscape that is still changing.

The book examines the social and economic consequences of open education and provide an insight into the way open education could contribute to a higher level of digital inclusion and to the establishment of new and innovative services of high social and economic merit.

Featuring case studies of initiatives, practices and projects this volume illustrates theoretical concepts and emerging models of open education in the context of the latest academic studies and entrepreneurial innovation.



Work in this book has been partially supported by the European Union in the context of the projects HoTEL and openED.



HoTEL Holistic Approach to
Technology Enhanced Learning

Hosting Innovators, Rooms for Success.

