Abstract Open Educational Resources (OER) can be seen as social movement but are also implemented as strategic measures in higher education (HEI). This chapter describes the current aims and experiences with the implementation of OER in HEI: Starting with definitions and milestones in respect of the current status, this chapter will therefore give an overview of projects and implementation objectives and it describes two concrete case studies, i.e.: the MIT Open CourseWare project and the OpenLearn project at the Open University in the UK. The aim of this chapter is to give a comprehensive overview to decision makers and policy drivers within higher education organisations and thus it develops a blueprint of an implementation model.

Keywords: Open Educational Resources, Strategic Integration, Higher Education, OER, Open Content, Open Access

Introduction

A free and open usage of educational resources such as books, tools and lectures is not possible for the majority of people. From the universities' perspective, the accessibility of learning materials is traditionally limited to students who have subscribed to a special course. Now, open content materials are available and distributed via the Internet and gain a lot of attention from international organisations as well as educational institutions. In the last few years, there have

been a number of high profile international initiatives promoting OER and the use of Open Source Software tools for learning. This chapter describes the current goals and experiences with the implementation of Open Educational Resources (OER) in higher education. Starting with definitions and milestones in respect of the current state of OER, this chapter therefore presents an overview of projects, implementation objectives and describes actual case studies. Additionally, the impact of Web 2.0 on the OER movement is described. The aim of this chapter is to give a comprehensive overview of OER implementation for decision makers and policy drivers within higher education organisations.

Definitions and Examples of Open Educational Resources

Much attention has been paid to Open Educational Resources (OER) in recent years, for example through the extensive media coverage of the Massachusetts Institute of Technology's Open CourseWare initiative (ocw.mit.edu), the work of the increasing number of organisations promoting Creative Commons licenses[1], and the success of Open Source Software applications such as Moodle (moodle.org) in the education sector.
Nevertheless, an authoritative definition of Open Educational Resources (OER) has not yet been agreed on. Stephen Downes writes that "there is a great deal of debate extant concerning the definition of 'open' resources" (Downes 2007, 299). However, the UNESCO International Institute for Educational Planning (IIEP) Forum formed a consensus that OER include Open Course Content, Open Source development tools and Open Standards and licensing tools (cf. International Institute for Educational Planning/UNESCO, 2001). Open therefore means that the content (inclusive of meta data) is provided free of charge, that the content is liberally licensed for re-use, favourably free from restrictions to modify, combine and repurpose, that it is produced in open format and designed for easy

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[1] Creative Commons is one of the most popular licensing schemes for open content that offers/allows a clear description of the author's and user's rights, e.g. the re-usage and modification of the materials, see http://creativecommons.org

re-use and developed and hosted with open source software (Geser 2007, 20).

In the following, we concentrate on the aspect of open content as one part of OER, and therefore disregard Open Source Software for educational purposes. This list illustrates the variety of formats of OER available on the Internet:

- slides and other lecture materials;
- reading materials and assignments;
- research papers and other scientific publications;
- figures, tables, photos and other illustrations;
- tools of e-assessment, such as online questionnaires, tests;
- videos of presentations or "how-to" material;
- collaborative work, for example developed with the wiki technology;
- communication spaces or applications for learners, for example discussion forums, mailing lists, groups within social network applications, also language learner networks;
- "interactive" materials such as web based trainings;
- descriptions on how to use materials, didactical approaches;
- software and applications with educational relevance;
- meta information about the materials;
- sources of information as encyclopaedias or news sites.

However, in reality, educational resource repositories and projects following the idea of OER are often not fully compliant with the above mentioned criteria or the definition by UNESCO: Hence, the meaning of "open" is often reduced to i) a free access to resources and ii) the possibility of use without authorisation to modify them. According to the OER definition, materials should also be liberally licensed, so that is allowed to use or, modify and republish them. Whereas the legal rights in the US provide the possibility of a "public domain" this is unknown in other countries: This relinquishment of the intellectual property rights in favour of the public is not possible in European countries like Austria or Germany. That means for the EU that, before using, copying or modifying learning materials created by someone else, one has to obtain prior permission of the copyright owner and enter into a contract with him/her. With an open content licensing, a clear descriptions of the rights of the au-

author(s) and the users supports the handling, re-usage and if wished, modification of materials. For example, the Creative Commons license "does not mean giving up your copyright. It means offering some of your rights to any member of the public but only on certain conditions" (Creative Commons 2006).

Milestones of the OER movement and exemplary projects

The OER movement has its roots in and also connections to the movement of Open Software and Open Access for scientific publications. Therefore the founding of the "Free Software Foundation" by Richard Stallman in 1985, the release of the Open Source operating system "Linux" in 1992, which later became one of the most prominent examples for the new software development process, the release of the Creative Commons License (2001), and the Berlin Declaration on Open Access to Science (2003) can all be seen as important for the core OER movement, too. Concerning the discussion on and around OER, the UNESCO initiative "free educational resources" was the initialising milestone in 2002 which brings a broader public interest in the topic. In 2003, the MIT Open Course-Ware project was another milestone. Afterwards, several important initiatives and projects were implemented, OER started to be one of the important topics in several weblogs and forums of educationalists. The OECD has published a study (2007) about OER based on the results of an international survey, and the William and Flora Hewlett Foundation have undertaken a review of the OER movement (Atkins, Brown, & Hammond 2007). The European Commission has also started to fund projects focused on open educational content and Open Source tools (e.g. OLCOS, Bazaar).

There are several projects and repositories where OER for HEI are developed and/or collected and presented. The following list gives some examples.

- MERLOT (Multimedia Educational Resource for Learning and Online Teaching, www.merlot.org): MERLOT is a growing catalogue of peer-reviewed online learning materials, organized by disciplines with currently more than 20.000 resources.

- OER Commons (www.oercommons.org): OER Commons is a teaching and learning network offering a broad selection of high-quality OER, using Web 2.0 features such as tagging and rating with currently nearly 15.000 materials and 2.500 libraries and collections.
- Open CourseWare Finder (OCW Finder, ocwfinder.com): The OCW Finder shows results from several collections and brings together materials from more than 200 international HEI institutions
- WikiEducator (wikieducator.org): A Wiki for collaboratively developed OER for schools and HEI with nearly 6.000 registered users
- Connexions (cnx.org): Connexions supports the collaborative development of OER organised in modules under a Creative Commons license and has currently more than 4.500 modules.

Other comprehensive overviews are provided by the OER-Wiki of the UNESCO (2009) or within the WikiEducator (2009).

Reasons for institutional involvement in OER

According to Hylén (2006), the following points are possible reasons for an institutional involvement in OER:

- Sharing knowledge is a good thing to do and also in line with academic traditions, ultimately supported by the United Nations Human Rights Declaration which states that "everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages." (Article 26, citation)
- Educational institutions should leverage on taxpayers' money by allowing free sharing and reuse of resources developed by publicly funded institutions to prevent double work and reinvention.
- By sharing and reusing, the costs for content development can be cut, and the quality would improve compared to a situation where everyone starts from the scratch.
- Institutions to be engaged in OER will profit from good public relations, the materials can function as a show-window attracting new students.

Besides these altruistic, political, and financial arguments on why and how institutions should invest in the involvement in OER, there are several arguments that build on the possible influences and effects of OER on learning and teaching and organisational culture in general: For that, we point out possible changes and challenges regarding the three aspects of education known as the "didactical triangle", i.e.: the subject, the learners and the teachers.

Concerning the subject itself, the accessibility of OER perhaps seems to be as of no big importance. But indeed, OER can lead to richer and more varied use of materials in lectures that a single teacher has no possibility to provide and develop, or is legally not allowed to use. The above mentioned materials give a lot of possibilities to diversify lecturers and learning in the sense of multimedia usage or creative content.

Concerning the learners, OER carries to several consequences:

1. First of all, the materials are available for free and normally easier than through copying and buying books. (Nevertheless, especially in an international context, the possibility to access these materials is restricted to computer and internet access which cannot be taken for granted for students in many countries). In general, students become more independent from materials developed by their own lecturer.

2. Additionally, people interested in a certain university can get insights into the quality of the learning materials provided by a (potential) institution. Last but not least, students can participate in the development of OER or create own learning materials, together with other students, and also lecturers. As known from pedagogical psychology, the possibility to serve as a tutor for other students pushes the student's learning enormously, the possibility to publish these materials can be additionally attractive.

3. The third aspect is the teachers or lecturers within higher education: With OER they have the possibility to get attractive and inspiring materials for their own lectures easily and quickly; at least easier than via normal channels (e.g. books in their library). Developing OER can also lead to an intensive cross-institutional exchange, collaboration and inspiration as well as reputation.

The consequences of the sketched changes and influences concerning subject, learners and teachers are also seen as potential to a shift of educational settings and didactical changes towards a new institutional learning culture: OER can take very different forms within educational settings as multimedia "click & learn" offers on the one hand, and source and result of a collaborative development within an arrangement of cooperative learning on the other hand. The latter approach can be seen as one form of an open educational practice also known as "open learning", which follows a competency-focused, collaborative paradigm of learning and knowledge acquisition. Within open educational practices priority is given to learning communities instead of teacher-centred education, and development of knowledge and skills required to tackling and solving problems instead of subject-centred knowledge transfer (see Geser 2007, p. 38). Generally, this demands an active, constructive engagement with content, tools and services in the learning process. OER is also to be seen as one (but not the only) crucial factor to develop these learning and teaching approaches and fitting organisational learning cultures: The knowledge society demands competencies and skills that require innovative educational practices based on open sharing and evaluation of ideas, fostering of creativity, and teamwork among the learners. Collaborative creation and sharing among learning communities of OER can be regarded as an important catalyst of such educational innovations. Therefore, OER should become a key element of policies that aim to leverage education and lifelong learning for the knowledge society and economy (cf. Geser 2007, Schaffert & Geser 2008).

Obviously, OER leads to new challenges, too: Students and staff who want to use or develop OER need certain competencies in the research of adequate resources, in using several application and licenses, and media competence in general. Nevertheless, the development of these competencies goes along with the demand of life long learning and new media competencies. Another critical issue is that the quality of these materials can not be guaranteed.

Examples of OER in higher education

There are several organisations within which OER was already implemented as strategic measure on an organisational level. In the following we will describe case studies from the US and the UK, the MIT Open CourseWare and the OpenLearn at The Open University. The following information is based on the self-description on the institution's homepage if no other sources are mentioned.

MIT Open CourseWare

The Massachusetts Institute of Technology, known as MIT, is one of the universities in the United States with a large scale OER programme. Following the description on the Webpage, the MIT considered the use of the Internet in pursuit of the of MIT's mission, which is described as "to advance knowledge and educate students". In 2000, the Open CourseWare (OCW) project was proposed and in 2001 it was announced in the New York Times. Open CourseWare represents complete course materials, including for example a syllabus, timetables, lecturer slides, assignments or video recorded classes. A pilot version of the OCW project goes online with 50 courses one year later. In 2003, already 500 courses were published as part of the official launch. In 2004, OCW adopts a Creative Commons license. In this year, Spanish, Portuguese and Chinese translations were made available, a first mirror site was established and other institutions collaborate with the MIT and start to create their own OCW. In 2005 the OCW project won a dozen awards, had 1.250 courses published and formed the OCW consortium. Since 2008, audios, videos and photos are available via popular content platforms content, such as YouTube, iTunesU and FlickR. Today more than 1.890 courses from 33 disciplines are available. The resources are totally institution based in the sense that all materials originate from MIT staff (Hylén 2006) and follow a "producer-consumer" model (Mora 2008, 62).
What were the objectives in implementing OER? How is their implementation supported and financed? Concerning the first question on objectives, the MIT homepage names two aims, i.e.: to provide

free, searchable access to MIT's course materials for educators, students, and self-learners around the world and to extend the reach and impact of MIT OCW and the "Open CourseWare" concept. Additionally, the OCW project is very often mentioned regarding as to how OER can serve as public relations measure (e.g. in Hylén 2006).

If there were concrete implementation plans or strategies and how the OER idea was disseminated within the MIT remains somewhat unclear. In 2000, a faculty committee proposed the idea, but nobody was forced to publish OER within the OCW project: Nevertheless, the vast majority, over 90 percent, of the faculty had already voluntarily contributed.

Concerning the financing, it is known that the MIT OCW initiative was funded jointly by the William and Flora Hewlett Foundation, the Andrew W. Mellon Foundation, the Massachusetts Institute of Technology (MIT), as well as support of a software company. Nevertheless, the costs of the project – currently just under $4 million a year – brought up the need for additional financing: The MIT asks for donations on their homepage, "We need and genuinely appreciate your personal donation to OCW".

The MIT and the other members of the OCW consortium try to continuously evaluate who their users are. A report states that the majority are learners, typically with a bachelor's or master's degree (48%), followed by students (31%), and educators (15%) (Carson 2005 in Hylén 2006).

OpenLearn at The Open University in the UK

Contrary to the OCW project of the MIT, which follows a prosumer-consumer model, our next case study, the OpenLearn project, follows a co-production model which includes external volunteer contributors (Mora, 2008, 62).

The OpenLearn project at the Open University in the UK is located in a distance learning university. In April 2008 5.400 hours of current content through over 450 study units ranging from 1 to 50 hours in study time from all academic levels, is available in the "LearningSpace" that is mainly aimed at learners. Additionally, 8.100

hours of archived content of almost complete courses are available in the "LabSpace", which serves as an enhanced learning environment with various tools and technologies (e.g. chat, video conferencing, video blogging, knowledge mapping), including materials that came from outside the Open University (Lane 2008). In April 2008, 60.000 registered users are using the "various social computing tools and technologies to make forum posts, create knowledge maps, book video conferences and keep learning journals as well as simply studying the Units)" (Lane 2008).

Lane (2008) describes as a direct result of the emergence of OERs as a new activity, most notably the launch of MIT's Open CourseWare project, that "strategic discussions were promoted by the Vice Chancellor and a Review Group convened to assess how the University should adapt to something that fits so closely with the University's mission" (Lane 2008). A reviewers' report was fully supported by the academic board and council in mid 2005, so a planning group was established to make proposals submitted to the William and Flora Hewlett Foundation.

The William and Flora Hewlett Foundation granted the University a "substantial sum" to establish an Open Content Initiative called "Open Learn" over 2 years in 2006: The objectives of the project were: to enhance learning experiences for users of OERs; a greater involvement in higher education by under-represented groups and empowerment for various support networks that work with them, an enhanced knowledge and understanding of OER delivery and thereby an enhanced understanding of sustainable and scalable models of OER delivery (see Lane 2008).

Internally the following aspects are summarised as results (Lane 2008): In general the OpenLearn project has demonstrated that the Open University can cope with rapid and large scale changes, and that it can implement the Web 2.0 philosophy of perpetual beta, release changes often and release early. According to Lane (2008), the project also attracted new students and brought the university into the "forefront of open education and web based learning" (Lane 2008) which lead to an enhanced external web presence and new (international) partnerships and co-operations (Lane 2008).

OER is now seen as established feature of the Open University the strategy for sustaining the development and the usage of OER gets into the focus, the current strategies are being built upon the follow-

ing three strands (Lane 2008): (i) to embed OER in all existing activities, where possible (ii) to secure additional recurrent and project funding and (iii) to investigate new business models and potential revenue strategies (p. 10)

Envisaged organisational changes through strategic implementation of OER

As we have seen in the case studies, different reasons for introducing OER in higher education exist. The following figure distinguishes currently envisaged organisational changes through strategic implementation of OER in higher education. Therefore, altruistic motives are not listed; this focuses on organisational processes and change.

Figure 1: Envisaged organisational changes through strategic implementation of OER. Annotation: The basic idea of this illustration is derived from a figure in Euler & Seufert, 2005 (about innovations through e-learning)

On the one side, the focus of the implementation lies in the optimisation of existing things or change and development of new things. On the other side, the implementation can be directed at existing and new target groups. The following four forms of envisaged changes can be distinguished.

- OER is implemented as catalyst of the development of a new learning approach and culture for and with existing students and teachers within their own organisation
- OER is implemented to create new (better) materials and approaches in collaboration with external learners and teachers through "open innovation"
- OER is implemented to optimise the accessibility of materials and to ensure the quality of educational resources developed for existing students and teachers
- OER is implemented to attract future students as part of public relation measures, as described in the example of the MIT. Additionally, the OER implementation can be a consequence of the contract specifications of sponsoring bodies. For example, the Hewlett Packard Foundation or European Commission tends to support or demand explicitly the development of OER. Therefore, OER is also implemented through market issues.

In reality, organisations focus often on more than one of these envisaged organisational possibilities for enhancement and innovation.

Blueprint of an implementation model

There are several good and convincing reasons why OER has been implemented in educational institutions, especially in higher education. Nevertheless, the introduction of an OER model on an organisational level is challenging and also produces costs. Thinking about an implementation, the institutions should give answers to the basic questions of organisational change: "What happens, if we will not introduce OER?" and "Why now?" to clarify how urgent and worthy an implementation is. According to Lane (2008) organisation have to decide whetherOER implementation is to be "central or marginal to the existing mission of the organization and whether it is there simply to maintain existing activity, albeit in a new form, or to act as an incubator or test bed for a new activity that serves the mission in previously unthought-of ways. In other words how do OERs fit both with organizational strategy and with organizational practices?" (p. 2).

The following implementation model is a blueprint, describing crucial steps and aspects which a successful strategy should imply. It builds on the experiences and descriptions of implementation in HEI, e.g. the case studies described previously.
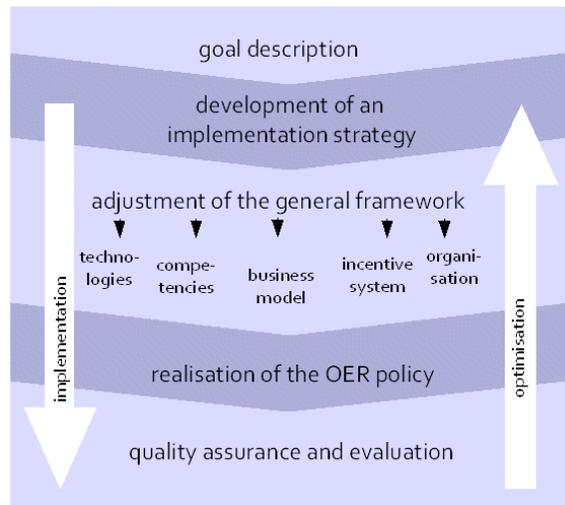

Figure 2: Implementation model of an Open Educational Resources (OER) policy

As described above, several aims for the implementation of OER exist. In a first phase, these aims should be clarified and discussed, because they influence all further steps, e.g. the evaluation of the process and its results.

The sketch of the implementation strategy describes these aims and how the framework has to be adjusted and who is responsible for what. As a comparison of OER projects and Open Source development shows, the OER projects are usually started more top-down institutionally driven than bottom-up (cf. Mora 2008).

The following aspects concerning the adjustment of the framework seem important: The technological infrastructure (e.g. the homepage

or repository and also the computers of the staff) within the organisation have to be adapted. The use, development and publication of OER need the development of new competencies for the majority of the staff, courses. The implementation of OER on an organisational level is also a question of money: Cost benefit analyses and financing strategies have to be developed. The aspect of "business model" includes the necessary development of alternative business models where the provision of learning materials was traditionally paid with students' fees. Another aspect are possible incentives for the creation of OER within the organisation: How can teachers be motivated to actively support the new policy? Last, but not least, an OER policy needs also a lot of arrangements on an organisational level, e.g. librarians within universities have to take over new tasks and responsibilities. Finally, the implementation of the OER strategy will be accompanied by continuous quality assurance and evaluation activities to optimise the impact.

Further recommendations on the implementation of OER, also on the level of educational policies and internationally and for the direct practice of usage and development of OER were produced within the European OLCOS project. It explores possible pathways towards a higher level of production, sharing and usage of OER and provides recommendations on required measures to support decision making at the level of educational policy and institutions. In particular, educational policy makers and funding bodies should demand that academic and educational resources that have been fully or to a larger part publicly funded are made freely accessible under an appropriate license (e.g. Creative Commons or similar) (see Geser 2007, and the OLCOS tutorials via www.olcos.org).

The impact of Web 2.0 on OER

Web 2.0 is the active development of perpetual betas, so that content and tools are always seen as unfinished and under construction, combined with new software applications, which makes the contribution to the Web and the collaboration with others easy.

OER is not a result of the new development of a "Web 2.0", but it deeply influences the technologies, policies, strategies and materials

of OER. For example, the variety and accessibility of tools and materials, e.g. Weblog postings, grassroots videos in YouTube, or liberally licensed photos in FlickR, and the possibility to integrate and to mash up these materials and services is impressive. The huge amount of resources and tools leads to the demand of new concepts of virtual learning management and the concept of "personal learning environment". Concerning our two case studies, the OpenLearn project directly built on Web 2.0: Lane (2008) argues that it has implemented "the Web 2.0 philosophy of perpetual beta, release changes often and release early", and additionally new tools are used and the co-creation with learners and external developers is supported. Not surprisingly, the majority of the younger OER projects build on the Web 2.0 philosophy and tools. This includes more interactive and collaborative development of OER, including other teachers and learners. Examples are the Curriki project (a Wiki with educational material for K-12, www.curriki.org), the LeMill project (a social network and enhanced Wiki system for teachers, lemill.org) or the WikiEducator project (a Wiki with educational materials focussing on technology enhanced learning, wikieducator.org). This new development has several consequences for institutions dealing with the idea of introducing OER as strategic measure. The Web 2.0 practice and tools deal more with unfinished materials and a lot of material "snippets", compared with the complete Open CourseWare materials, including bulky and not easy to modify (if allowed) materials (e.g. pdf). Web features as tagging, rating, comments, reviews and social networking are additionally implemented, for example at the OER Commons project (oercommons.org).

This Web 2.0 influence in the OER development also includes the usage of distributed tools such as several Wikis, Weblogs, media portals (such as FlickR or YouTube) as well as social networking sites (such as MySpace or LinkedIn), and a new concept should probably include such developments. Future institutional offers of OER will mash up these distributed resources.

Conclusions and Outlook

There are several reasons and objectives why institutions in higher education should be or are engaged in the development and use of OER, for example: altruistic motives to share knowledge, or the possibility to gain positive PR, or projects granted by sponsor institutions, which favour OER initiatives. From our point of view, the possible changes, concerning learning and teaching activities and the learning culture within a university, especially if collaborative developments of OER are supported, should gain more attention. If universities think about a strategic integration of OER, they should think not only about implementation issues, but also on the general fitting of OER into the current organisational culture and structure.

Despite considerable investment in technology enhanced teaching and learning, there is little evidence of profound changes in educational practice. In particular, the idea that the use of ICT would promote student-centred and collaborative approaches to teaching and learning has not been fulfilled. Instead there appears to be a growing mismatch between institutional approaches to teaching and learning and strategies and practices of knowledge development and implementation in the world of work. In addition, there is also a growing gap between institutional practice and the way young people are using technology to communicate and for "creative activities, writing and posting of the internet, mixing and constructing multimedia and developing their own content" (Lenhart and Madden, 2005). OER may form a key element in policies aimed at leveraging education and lifelong learning for developing a knowledge society and economy. Simply incorporating OER within a model of teacher-centred knowledge transfer will have little effect in equipping teachers, students and workers with the competences, knowledge and skills to participate successfully in the knowledge economy and society.

The introduction of OER policies in higher education is important, but should be accompanied by the development of fitting open educational practices based on a competency-focused, constructivistic paradigm of learning to promote a creative and collaborative engagement of learners with digital content, tools and services in the learning process. The Web 2.0 in general and its influence in the

OER projects towards more collaborative development of OER and
an even more liberally licensed approach could support this.

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