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Digital fluency for Open Educational Resources: The active role of libraries in establishing OER in Germany's higher education sector

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DIGITAL FLUENCY FOR OPEN EDUCATIONAL RESOURCES: THE ACTIVE ROLE OF LIBRARIES IN ESTABLISHING OER IN GERMANY'S HIGHER EDUCATION SECTOR

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Abstract

Free access to education, information and knowledge is a declared educational policy goal that all state universities in Germany strive to achieve. Open Educational Resources (OER) make an important contribution to this, as their use is open to all teaching staff and learners. The development, use and distribution of OER is currently focused by several government funding grants, but still has not fully arrived in the country's educational practices. Reasons for this include the fact that dealing with OER requires sound knowledge much of which relates to copyright and licensing law. In addition, for the technical design and provision of extensive OER (e.g. courses, self-learning modules), competencies for dealing with (complex) digital systems are particularly necessary. In order to develop competencies for OER and thus promote their establishment, incentive and support measures are of particular relevance. While legal and didactic topics are focused on in a wide range of continuing education programs from established institutions, the technical design of OER (e.g., using Markdown or Git) is often not taken into account. This is where libraries come in: Since they are key actors in the field of Open Science and - as infrastructure institutions - possess a high level of technical expertise, they also play a crucial role in supporting the development of digital fluency for the technical creation of OER.

The paper states the current status of the implementation of OER in the Germany higher education sector. In particular, the role of libraries as multipliers for a culture of open access to education and knowledge is taken into focus. As a practical example to support competence development for using OER - with special regard to their technical creation - a digital training concept of the TIB (Leibniz Information Centre for Science and Technology | University Library) in Hanover, Germany is presented and reflected upon.

Keywords: Open Educational Resources, Digital Fluency, German Higher Education, Continuing Education

1. Introduction: OER from an Educational Policy Perspective

A free access to education, information and knowledge is a declared educational policy objective in Germany's higher education sector. The reasons for this include the fact that Germany has a broad state-funded higher education system. It is strongly believed that research data and results as well as teaching and learning content that was created at state-funded institutions, should be made available to the general public as a means of reducing educational inequalities [cf. Bernd/Möller 2022, Grimm 2022]. Against this background, Open Educational Resources (OER)[1] have a special role to play alongside the areas of open access and open science [cf. BMBF 2022, Bündnis Freie Bildung 2018, KMK 2016]. Since they allow free use, dissemination, further development and adaptation to different teaching and learning contexts, Open Educational Resources carry the guiding principle of open education.

In order to promote the dissemination of OER across German universities and to make their use a lived practice, OER have been and are being focused in several government funding grants all over the country. For example, since 2019 seven of Germany's 16 federal states have ongoing funding initiatives with the common goal of building and expanding infrastructures that enable the provision and use of openly licenced educational materials and at the same time promote cross-institutional collaboration among university teaching staff [cf. Deimann 2019, OER Repo AG n.d., Krause/ Krempkow 2021]. The educational policy objective is also reflected in the fact that in more and more third-party funded projects a willingness to publish research results as open access publications and to share the resulting teaching materials under an open license is becoming an obligatory funding criterion.

In addition to their relevance within educational policy, OER bring a few major advantages for teaching staff [cf. BMBF 2022, Koschorreck 2018, Ladwig 2022, Menzel 2021]:

1. Open educational materials can be easily adapted to specific teaching and learning contexts and individual needs of learning groups. Building on structures that have already been tried and tested can significantly facilitate the design of one's own courses.

2. OER contribute to the reduction of reputational asymmetry between research and teaching activities. In particular by creating and sharing OER, one's teaching expertise can be made publicly visible. This can have a positive effect on the reputation of teaching staff in the scientific community.

3. OER contribute to the internationalization of teaching. Since they enable rapid linguistic adaptation, they can be used as a means to compete internationally in the education market.

4. OER promote cross-institutional networking among teaching staff since they can be further developed collaboratively. A long-term exchange on OER favors the establishment of network structures between educators from different institutions and subject areas.

5. The constant, collaborative review, correction, and adaptation of educational materials keeps them updated and provides the opportunity for iterative quality assurance.

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[1] According to the UNESCO's definition, Open Educational Resources refer to „teaching, learning and research materials in any medium – digital or otherwise – that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions" [UNESCO 2019].

It must be noted that the added value does not lie in the provision of open educational materials alone. It rather requires a well comprehensible purpose-means representation to make the relevance and added value of OER more apparent in the higher education context [cf. Ladwig 2022]

2. The Current Status of the Establishment of OER

Despite the above mentioned advantages and political measures concerning OER and although the idea of openness with regard to education is generally supported by higher education institutions, the use and own creation of OER has not yet fully arrived in the educational practice of German universities [cf. Otto 2019]. The biggest challenge in establishing open educational materials is to bring about a shift toward a culture of openness, collaboration, and sharing across all educational sectors. In order to initiate this cultural change, it is essential to create a clear framework for OER. Universities have to anchor the topic in their strategic actions and link it with university didactics and teaching innovation [Ladwig 2022]. However, at present there is often a lack of clear signals from institutions for the use of OER [cf. Bozkurt 2020, Otto 2022]: Only very few German universities have an OER policy that encourages their employees to release their materials under an open license and provides an orientation framework for this process. However, it has to be noted that German universities have recognized the lack of a clear framework as an obstacle. Therefore, many institutions are currently working on the creation of an OER policy and are setting up responsibilities for OER consulting.

Another important reason why OER are not yet established across German universities, is that knowledge and skills for the use and creation of OER do not yet rank as key competencies or general knowledge among university educators. There are deficits in understanding the legal framework and how OER can be published and used didactically. Teachers are also often unaware of the advantages of open teaching and learning materials [cf. Riar et al. 2020]. Uncertainties and unanswered questions need to be addressed before teaching staff can easily incorporate OER development into their work [Mayrberger 2018].
Dealing with OER requires sound knowledge much of which relates to copyright and licensing laws. In addition, for the technical design and provision of comprehensive OER (e.g. courses, self-learning modules), skills and competencies for dealing with (sometimes very complex) digital systems are particularly necessary. In order to develop competencies for OER and thus promote the comprehensive dissemination of open educational resources, incentive and support measures are of particular relevance [cf. BMBF 2022, Otto 2021]. While legal and didactic topics are focused on in a wide range of continuing education programs from established bodies (e.g. Future Learn Lab, eBildungslabor, WirLernenOnline), the *technical* design of OER is often not taken into account.

The markup language *Markdown*[2] (or technical applications based on it) and the *GitHub*[3] service are particularly important for the creation of open educational materials. The reason for this is that they make it possible to design and distribute OER in an open manner not only in legal terms but also technically [cf. Dürkop 2016, Ovadia 2019, Schröder/Pfänder 2020]. The markup language and the service are particularly suitable for OER since they are available free of charge and allow content to be made available in an (open) source, to be used flexibly and converted into different formats, to be edited jointly, and to manage versions. This represents a major advantage over common formats for documents (e.g., PDF, DOC, ODT) and represents

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[2] Markdown is a machine readable language that can be used to format text and data. Unlike other markup languages, the markdown syntax is simplified. Therefore, the language is easily learnable. Programming skills are not required.

[3] GitHub is a network-based service for version management. Usually used for software development projects.

an opposition to the restrictions of common learning management systems (e.g., limited interoperability, limited public access). Of course, Markdown and Git have been available for a long time, but in Germany - outside of technical fields of work - they are not yet widespread. Competencies for using Git and Markdown are not yet key competencies for educators, especially in humanities and social sciences. Against this backdrop, there is a high demand for training opportunities for teaching and educational staff that aim to promote competencies for using Markdown and GitHub explicitly to develop OER [cf. Ovadia 2019]. This is where libraries come into play.

3. The Role of Libraries in establishing OER

The core task of libraries in the course of the progressive digitization of teaching and learning in universities, is to create open access to education and knowledge and to promote and support the development of a culture of sharing. As infrastructure institutions libraries are specialists when it comes to technical possibilities for dissemination of information. So supporting the development of digital fluency for the technical creation of OER is a field of action that libraries can play a key role in - for the provision of OER infrastructures on the one hand and consulting and education on the other [cf. Fahrenkrog 2016, Stummeyer 2019].

A Look into Practice: The TIB's eTrainer Concept
TIB - Leibniz Information Centre for Technology and Natural Sciences and University Library is a national provides science, research, industry and business with literature and information - in print and electronic form. The library is committed to openness, open access to information, publications and scientific data.As a university library, the TIB provides the literature supply for the Leibniz University of Hanover, but even more importantly, the TIB is a competence centre for digitisation in science and technology. The institution is active in research and development that focuses on Data Science and Digital Libraries, Scientific Data Management, Non-textual materials, Open Knowledge, Open Science and Visual Analytics.

TIB - Leibniz Information Centre for Technology and Natural Sciences and University Library is a national institution providing literature and information to science, research, industry and commerce. As a university library, TIB ensures the supply of literature for Leibniz Universität Hannover, and as a research institution it is constantly expanding its role as the German information center for the digitization of science and technology. Its research focuses on Data Science & Digital Libraries, Scientific Data Management, non-textual materials, Open Knowledge, Open Science and Visual Analytics. TIB provides a wide range of infrastructures and services, one of which is the OER-Portal www.twillo.de. Twillo is the central repository for open educational materials in the state of Lower Saxony. The platform addresses primarily university teaching staff, but also other university employees such as employees of university didactics or eLearning centers.The portal allows users to share their own teaching and learning materials openly and to download OER for their own courses. Besides the platform itself, twillo offers consulting and education on legal, didactic and technical aspects of OER.

With the goal to support the development of digital literacy for the technical creation of OER, more precisely to support competence development in the use of Markdown and Git explicitly to

develop open teaching materials, a digital Train-the-Trainer program is designed, tested and implemented in the TIB's project „TOERN"[4]

The offer will be an interactive online course that is based on the principles of problem-based learning. In order to enable participants to document their learning process and make acquired competencies visible, the offering integrates learning outcome tests and the awarding of digital badges as proof of acquired competencies. The educational offering will be made accessible to a broad public through a connection to the German national education platform that is currently under development.

Structure of the Train-the-Trainer-Program

The training program is designed as a digital setting that is worked on in self-study. It is divided into three modules:

1. OER Basics (a thematic introduction)
2. Technical OER Creation
3. OER Publication (conclusion).

The second module is the main focus and therefore the most comprehensive part of the training program (see fig. 1)
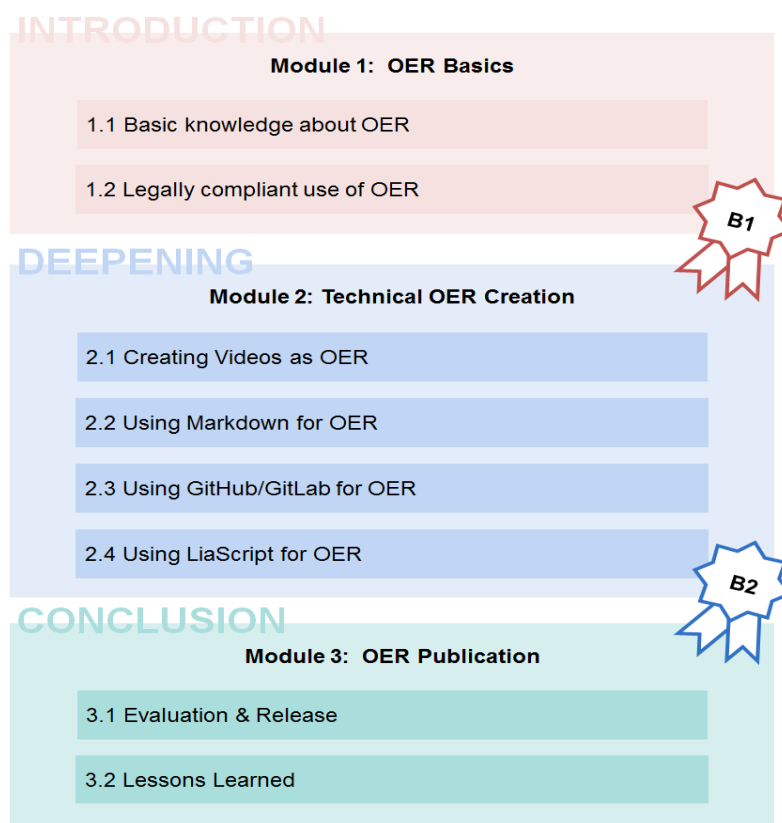

Figure 1: Structure of the educational program

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4   The project 'TOERN - Sharing Open Educational Resources on the National Education Platform' (led by Margret Plank and funded by the German Federal Ministry of Education and Research) aims to connect the Lower Saxony OER portal www.twillo.de and the central OER search index www.oersi.org to the national education platform. For this purpose, the two OER infrastructures will be further developed in a user-centered way and made internationally connectable. In addition, the In addition, competence development for dealing with OER is at the center of the project.

Each module comprises several (thematic) sub-modules. In order to work through the entire course, knowledge from the preceding units is required. However, to take the individual educational needs, motivations and interests of potential participants into account, all sub-modules are self-contained and can therefore be worked on independently of one another.

In order to stimulate an active learning process of the participants, the training program is designed according to the principles of action-oriented didactics [cf. e.g. Jank/Meyer 1994]. Within the individual sub-modules, the participants are guided through the creation of their own OER in their respective subject area along practice-oriented tasks.

In order to support the participants with reflecting on the content learned and to check the learning success, a self-assessment is available at the end of the first two modules. After successfully completing the self-tests, participants receive a digital learning badge (based on the international Open Badge standard) with which they can document their learning progress.

Content planning

Module 1, *OER basics,* represents the introduction to the training program. Its aim is to enable participants to distinguish OER from closed educational materials and to teach them how to reuse OER in a legally compliant manner. Furthermore, the participants learn how to plan, design and create their own OER. For this purpose, the licensing of one's own materials - in which third-party content has been integrated - is taken into focus.

The sub-module 1.1 serves to acquire theoretical knowledge about the central characteristics of open educational materials. Special attention is paid to copyright law and open licensing. In interactive exercises, the opportunities and challenges of OER are examined.

The sub-module 1.2 focuses on practical use cases. Participants learn what to consider when incorporating third-party content into their own works and what rules have to be observed when remixing OER. The focus here is on the question of how the use of third party content may influence the licence of the overall work.

After completing the two units of the module, participants have the opportunity to obtain their first digital badge (B1 - OER Novice). For this purpose, a self-test consisting of multiple choice questions and assignment tasks must be completed. The assessment deals with the topics of copyright and open licensing (1.), citation and integration of OER in one's own work (2.) and remixing of content (3.).

Module 2, *Technical OER Creation*, is the practical phase of the training program. The aim is to show the participants what digital tools exist for creating educational materials as well as making them openly available not only in terms of licensing law, but also technically.

The main focus lies on the advantages of using software and applications that make it possible to transfer content flexibly into different (end) formats or forms of presentation. Within each sub-module, the participants get to know the interfaces of one specific tool and get the chance to try out its most important functions for creating OER. Each sub-module is structured as a self-contained learning unit that covers the levels of beginners to advanced learners.

Sub-module 2.1. covers possibilities to create open educational videos with simple means. For this purpose, practical examples will be used to explain what needs to be considered when preparing videos as OER and which open standards have to be met. The open source program Shotcut for film editing and processing as well as the screencast recorder OBS (Open Broadcaster Software) will be examined and the integration of interactive H5P elements are discussed.

Sub-module 2.2 serves to familiarize participants with Markdown. In addition to the functions and syntax of the simplified markup language, participants learn about two collaborative editors

(HedgeDoc and CodiLia) that can be used to write Markdown documents and transfer them into different formats (e.g., presentations or courses).

Sub-module 2.3 focuses on the features of the GitHub web application for creating OER. The aim is to give participants an orientation in the (complex) working environment of the service and to support them step by step in the design and multimedia publication of an interactive learning unit.

In sub-module 2.4 participants are introduced to the open source application LiaScript, which is used to create online courses with interactive content (e.g. animations, mathematical formulas, quizzes). To complete this module, competencies in working with Markdown and GitHub (Modules 2.2 and 2.3) are required. Aside from the software's overall functions, the participants learn how to edit course structures locally by using an editor and how to publish their work (via GitHub).

At the end of the module, participants will again have the opportunity to complete a self-assessment with multiple choice questions and small practice tasks (e.g. formatting in Markdown). The thematic focus is on Open Standards for videos (1.), Markdown syntax (2.) as well as functions of the service GitHub (3.). After successfully completing the self-test, participants will receive their second digital badge (B2 - Technical OER Creator).

Module 3. *OER Publication* concludes the training program. The module is designed to support the participants in the critical evaluation of their own OER. In addition, possibilities of disseminating OER with the help of the central OER portal of the state of Lower Saxony (www.twillo.de) are presented. Another goal is the reflection of the individual learning process of the participants.

The sub-module 3.1 deals with questions of quality assurance of OER. The main focus lies on the critical assessment of self-created materials. Furthermore, the functions and workflow of the OER portal www.twillo.de are presented as a possibility for the publication and dissemination of educational materials.

In sub-module 3.2 the key contents of the entire training course are summarized. The participants are encouraged to reflect on their learning process and to identify further educational needs with regard to OER.

4. Conclusion

Opening up free access to education, information and knowledge is a declared educational policy objective in all of Germany's areas of education (BMBF 2022). An important contribution to this are Open Educational Resources (OER) that enable the free use, dissemination, further development and adaptation to different teaching and learning contexts. In order to promote a culture of openness, collaboration and sharing in higher education teaching, it is important to have reliable infrastructures and tools for OER and, in particular, digital fluency among the actors. In Germany, as stated in this paper, the digital skills of teaching staff are often still not adequate for the requirements of the digitization of teaching. Educational offerings that deal with legal, didactic, and technical issues in the use of OER are of particular relevance [cf. Ladwig 2022, Riar et al. 2020]. Libraries have always played a key role in teaching digital skills needed to make information available and accessible in the long term. TIB develops, tests and implements a digital training program for the development of digital skills for the technical creation of OER, which is introduced in this paper. The format itself corresponds to the characteristics of OER: it is planned as a freely accessible and openly licensed offer, which allows subsequent use of all content. With this program, TIB aims to support a culture of sharing and thus contribute to modernization and innovation in education.

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