

# Adoption and Diffusion of Open Educational Resources (OER) in Education

## A Meta-Analysis of 25 OER-Projects

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Résumé de l'article

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# Adoption and Diffusion of Open Educational Resources (OER) in Education: A Meta-Analysis of 25 OER-Projects

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## Abstract

The concept of open educational resources (OER) is becoming increasingly prominent in education. However, research circles around defining OER, content and forms of OER, technological features of OER, and the importance of the issue or lack thereof. Vital aspects such as the notion of the adoption of OER by educational practitioners remain underdeveloped. In order to shed light on the question of how to adopt OER in education, the article presents findings of a meta-study which critically reviewed 25 state-funded OER projects located in Germany. All projects aimed to anchor OER across educational areas, such as school, higher, continuing, and vocational education. The meta-analysis disclosed a mixed bag of results. Although interest and willingness to deal with OER can be confirmed, reservation is rooted in the complexity of the topic and especially the legal concerns. However, the findings demonstrate that OER can by no means be ignored in the context of teaching and learning in a digital world. Integrating OER as an aspect of existing educational training should, therefore, be encouraged. Concerning future design recommendations, to conflate OER with other pressing issues and to simultaneously emphasise its added value explicitly is a promising approach. Moreover, establishing central contact points in educational institutions to accompany and monitor actors on their path to OER appears to be necessary. Notwithstanding the concrete measures, any strategy must operate persistently at both levels, institutional and practical, embracing all relevant stakeholders.

*Keywords:* open educational resources, OER, educational training, meta-analysis, learning and teaching support, cross-educational, OER mainstreaming

## Introduction

The value and pivotal importance of open educational resources (OER) for the broader field of education have become evident ever since their first emergence at UNESCO's 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries. Notwithstanding that there are no canonical, but numerous competing, definitions, a commonly accepted understanding is that OER describe

any educational resources (including curriculum maps, course materials, textbooks, streaming videos, multimedia applications, podcasts, and any other materials that have been designed for use in teaching and learning) that are openly available for use by educators and students, without an accompanying need to pay royalties or licence fees. (Kanwar & Uvalić-Trumbić, 2011, p. 4).

It is important to mention that OER cannot be understood as being synonymous or interchangeable with open science, open pedagogy, or open education (Cronin & MacLaren, 2018). Although interdependence and overlap exist, substantial differences occur in terms of practical usage and fundamental objective (Wiley & Hilton, 2018). While open science aims to render scientific processes comprehensible and accessible, open pedagogy encourages students to improve or create course content. Open education can be understood as a wider movement towards broadening access to and participation in education. OER, on the other hand, are primarily content and not an educational model or practice per se (Mengual-Andrés & Rico, 2018). While the lack of clarity between the concepts can rightly be criticised (Kerres, 2019), the concept of OER is now based on a solid theoretical and empirical ground (Bozkurt, Koseoglu, & Singh, 2019). Moreover, the OER movement has gained momentum and extended rapidly (Clements, Pawlowski, & Manouselis, 2015; Santos-Hermosa, Ferran-Ferrer, & Abadal, 2017). The primary purpose for using OER is to facilitate access to education, and to enable collaborative and participatory innovative teaching and learning. OER are assumed to broaden access to education, to reduce the costs of materials, and to improve the overall quality of teaching.

Throughout the last two decades, a rapidly growing amount of OER has been developed in all fields of education (Clements et al., 2015). The OER World Map continuously monitors global OER development, and facilitates interaction and collaboration through collecting and sharing open data about actors and activities related to OER. The growth of OER also entails the creation of several repositories which make OER widely available and allow users to find, create, and share them. Santos-Hermosa et al. (2017) revealed that OER repositories are mainly multidisciplinary, institutional, and predominantly based in Europe or the US. Notwithstanding discussions about pedagogy, quality assurance, and sustainable business models, repositories have undoubtedly enhanced and facilitated access to OER. Several studies have focused on establishing guidelines for finding and using these repositories (Kanwar & Uvalić-Trumbić, 2011).

Despite these substantial achievements, one of the major problems is to attract attention to the adoption and practical use of these repositories and OER across all fields of education. This article is based on the argument that little attention has been paid to this subsequent—or concurrent—step which is to spur adoption and use by the main practitioners, namely teachers and students. This step is critical for the prevalence and diffusion of the practical use of OER in all fields and levels of education. The provision of training for practitioners and teachers on how to engage in the 5R activities (i.e., retain, reuse, revise, remix, and redistribute) is a decisive factor. Research hitherto circled around defining OER, content and forms of OER, technological features of OER, and the importance of the issue or lack

thereof. Central aspects such as the notion of the adoption and use of OER by practitioners remain underdeveloped. Referring to this, Mishra (2017) voiced concerns that to create awareness among teachers and students regarding the adoption of OER—the use and creation of OER, including the integration of OER in teaching and learning—is crucial, as they are the most important stakeholders in the OER ecosystem. To shed light on the question of how to adopt and thereby enhance the use of OER in education, this article presents findings of a meta-analysis which critically reviewed 25 state-funded OER projects located in Germany. All projects focused on enhancing the visibility, strengths, and potential of OER through training competence for educational and advisory staff in at least the following four sectors:

- finding OER,
- using OER,
- creating OER, and
- sharing and providing OER.

The projects' target groups comprised educational and advisory staff at all educational levels, such as schools, higher, continuing, and vocational education. For the meta-analysis, all projects were reviewed and clustered based on their target achievement, target groups, measures, and impact regarding OER. Factors that hamper or facilitate the adoption of OER were identified. As a further result, design recommendations were derived on how to implement and promote training about OER.

The article is structured as follows. The following section reviews the existing literature on the challenge of adopting OER in education. Section two presents the methodological approach that was applied to render the research results. In section three, the 25 OER projects incorporated in the meta-analysis are described in terms of their core objective, range, measure, and main output. The main results are presented in section four and discussed in the subsequent section. The article concludes with a summary view and recommendations on how to implement and promote training to enhance the adoption and use of OER in education.

## **Research on OER Adoption and Use**

As previously mentioned, the availability and number of repositories for OER worldwide have expanded. Since the beginning of the OER movement, several types of initiatives have been launched such as institutional initiatives for open courseware models or sustainability projects for OER (D'Antoni, 2009; Wiley, 2016).

Despite the growing availability of OER, a glance at the literature suggests that the adoption of OER into teaching practices at all educational levels is sluggish at best. However, the exploration of OER needs to go beyond the creation of repositories, and focus on the inquiry of how to best transfer OER into practical education (Conole, 2012). Hitherto, studies have consequently been focused on incentives and barriers for the adoption of OER.

Belikov and Bodily (2016), based on 218 US faculty responses regarding OER, found that primary barriers to the adoption of OER are the need for more information, lack of discoverability of OER

repositories, and confusing OER with digital resources. A five-year program in the Netherlands called Wikiwijs was intended to encourage the use, creation, and sharing of OER by teachers from various education levels (Schuwer, Kreijns, & Vermeulen, 2014). The results suggest that for mainstreaming, OER has to be affiliated with other interventions that are focused on prescriptive policies and regulations. Directive persuasion of executive boards and teachers in schools to adopt OER is a crucial aspect. Schuwer and Janssen (2018) interviewed 55 stakeholders (educators, board members, and support staff) in 10 Dutch higher education institutions to facilitate the adoption of open sharing, and reuse of learning materials and open online courses. They found that motivation for sharing and reusing learning materials was connected to the ambition to achieve better education for students. An essential barrier for sharing and reusing learning materials is insufficient awareness of opportunities for open sharing and reusing, and lack of time. Bossu, Bull, and Brown (2012) examined the case of OER use across the higher education sector in Australia and confirmed existing misconceptions about the nature of OER and lack of awareness regarding its potential. From an Asian perspective (focused mainly on China, Hong Kong, India, Indonesia, Japan, South Korea, Malaysia, Philippines, and Vietnam), whilst OER is becoming mainstream in many regions and institutions, uptake is slow, hampered by the inability to effectively search and locate desirable OER (Abeywardena, Dhanaraja, & Chan, 2012). Hart, Chetty, and Archer (2015) provided insights into the adoption of OER by staff in distance education in South Africa. Using a five-stage model, their survey conducted at the Unisa University revealed that while there was knowledge and understanding of OER, this had not been widely converted into active participation, and therefore had not moved towards the decision and implementation stage. In a similar approach, Percy and Belle (2012) explored barriers and enablers for the use of OER by university academics in Africa. Based on survey questionnaires, they identified that performance expectancy and effort expectancy had a positive effect on the use of OER; facilitating conditions did not have a statistically significant effect. As additional barriers, they identified discovery, relevance, context, and individual resources. A cross-cutting study was conducted by Kelly (2014) covering educators and training professionals in K–12 and higher education. Her discriminant function analysis discovered that especially K–12 educators find OER relevant to improve their practice.

All of the studies presented endorse that despite substantial achievements, significant barriers towards the adoption and engagement with OER exist in all of the institutions regardless of country and educational area. Across all studies, training educational and advisory staff appears to be a central mechanism to empower them to engage confidently in the 5R activities. However, research so far has predominantly contributed case studies that examine single institutional policies or practices, making them contextual and coupled with specific conditions. Therefore, recommendations and barriers are limited to inductive inferences which are bound to particularities of the case presented. Moreover, in terms of methodology, these studies primarily use survey data as a method of investigation.

## Research Design and Method

Meta-analysis has become prominent as a methodological approach in the field of education (Ahn, Ames, & Myers, 2012). For a long period, meta-analyses have been predominantly perceived as synonymous with quantitative syntheses of information from several studies. Meanwhile, however, qualitative meta-analysis has spread in several subject areas (Levitt, 2018; Timulak, 2009; Zimmer, 2006). As it is a recent development in qualitative inquiry, there has been criticism that qualitative meta-analysis intrudes upon the tenets of the interpretive paradigm. However, a qualitative approach

towards meta-analyses can make a valuable contribution to deepening the understanding of results, and contextualising them in manners quantitative approaches cannot.

On a general level, a qualitative meta-analysis is particularly preferable for a systematic analysis of qualitative studies in a way that it is somewhat interpretive rather than aggregative (da Costa, Hall, & Spear, 2016). Since many systematic analyses, as this article illustrates, are designed to inform policy and practice in the field, it is essential to select a method of investigation that will yield the kind of inferences envisaged (Zimmer, 2006). The qualitative meta-analysis in this article is intended to derive lessons learned and design recommendations in an explorative manner. Hence, an inductive and interpretative method of qualitative content analysis was chosen to secure a systematic approach to rendering results (Mayring, 2000).

The relevant sample for the meta-analysis encompassed all 25 OER projects that were part of a project funding line. From these 25 projects, 22 were incorporated in the meta-analysis as they implemented measures regarding the adoption of OER. The remaining three projects were excluded because their primary objectives were either to aggregate and disseminate information or to conduct organisational or evaluative measures (Blees & Mollenhauer, 2018; JOINTLY, 2018; Waffner & Münzinger, 2018).

The data set used for the meta-analysis was a special volume of the German journal *Synergie* (Mayrberger, 2018). The journal is committed to topics around teaching and learning with digital media. The special volume was examined because it was dedicated entirely to all 25 OER projects to present their results, activities, and experiences with a particular focus on the lessons learned and future perspectives of OER. All contributions were structured in a similar manner which, in methodological terms, facilitated the analysis in terms of interpretation and comparison. The structure of the projects' reports mainly appeared as follows:

- project information,
- target group,
- objective of the project,
- results,
- lessons learned, and
- outlook.

The primary emphasis of the qualitative analysis was on the lessons learned and the outlook in each of the reports.

As the method for the qualitative analysis, the content analysis from Mayring (2000) was applied. This method consists of a bundle of techniques with the objective of systematic text analysis. Advantages of quantitative content analysis are merged with interpretative steps. The object of the content analysis can be all sorts of recorded communication. As the nature of the meta-analysis was explorative, seeking to derive lessons learned and design recommendations inductively, an inductive coding category development approach was chosen over deductive category application. A vital starting point for the analysis was "to develop the aspects of interpretation, the categories, as near as possible to the material,

to formulate them in terms of the material” (Mayring, 2000, p. 3). In the process of conducting the analysis, the inductively derived categories for each document were invoked to be compared and combined across the different projects to determine the effect size of the different categories. In the next step, the categories were aggregated to the extent of the lowest common trait that described all categories subsumed under the trait. As many of the projects covered multiple educational areas, aggregation of the final categories was transferred to a general level of education. However, the data was concurrently inquired to carve out particularities which could be assigned to certain educational areas.

As a final step, the categories derived were assigned to two broader classifications: lessons learned and design recommendations. Design recommendations refer to the design approach to educational research (Kerres & de Witt, 2011) and thus were intended to inform educational research and educational practice about educational problems, in this case, how to implement and promote training to spur the adoption of OER.

## Sample Description

Table 1 describes the sample included in the meta-analysis. The overview systematically classifies all 25 projects of the funding line regarding the following categories: publication analysed, period, target group, area, measures implemented, and main output.

Practitioners in key positions in their respective fields of education (e.g., in charge of the training of educational staff), were the central target group of the projects. In this manner, a snowball effect was intended to anchor the topic systematically and institutionally in the respective educational areas.

Table 1

### *Overview of the 25 Projects Included in the Meta-Analysis*

Project and publication analysed	Period	Target group	Area	Measures	Main output
LOERn (Fritz, 2018)	18 months	School, vocational education	Regional	Training, material production, self-study courses, production of explanatory videos.	About 870 persons trained to be professional OER multipliers
openUP (Honikel, 2018)	18 months	Higher education	National	Material production, workshops.	140 persons trained to be professional OER multipliers.
MainstreamingOER (Waffner & Avseren, 2018)	18 months	School, higher education, continuing education, vocational education	Regional	Material production, online workshops.	Persons trained to be professional OER multipliers.

OSM@BB (Nestler, 2018)	17 months	School, higher education, continuing education	Regional	Material production, training, conferences.	Persons trained to be professional OER multipliers.
OER@RLP (Wieggers & Faber, 2018)	18 months	School, higher education, continuing education	Regional	Information, awareness and qualification events.	More than 1400 persons trained to be professional OER multipliers.
MOIN (Bittner, Herbstreit, Krause, & Lehmann, 2018)	18 months	School, higher education, continuing education	Regional	Material production, networking for various actors.	Increase visibility, awareness, and qualification for OER.
MAT <sup>3</sup> (Prediger & Kortenkamp, 2018)	17 months	Higher education, continuing education, vocational education	National	Material production, design guidelines for quality in adaption processes.	OER use for mathematics teachers.
OERsax (Lauber-Rönsberg, Bergert, Geburek, & Horlacher, 2018)	18 months	Higher education	Regional	Public relations, provision of free learning content.	Disseminate open teaching content.
use-oer@htwsaar (Use-oer@htwsaar, 2018)	23 months	Higher education	Regional	Website and press relations, focus seminars, information and consultation talks.	Raise awareness in the region, train lecturers and multipliers.
SynLLOER (SynLLOER, 2018)	18 months	School, higher education, continuing education, vocational education	Regional	Lectures, material production, training, cooperation formation.	18 lectures, 59 further training.
civicOER (Bremer, Leitzmann, & Sonnberger, 2018)	18 months	School, higher education, continuing education, vocational education	National	Consultation and qualification of actors, creation of OER materials.	Qualification of teachers at schools and universities, and actors in civil society.
OER-MuMiW (Lorenz & Preusse, 2018)	18 months	Continuing education	Regional	Workshops.	40 people completed workshops, creation of 40 projects.



MINT-L-OER-amt (Lubna, Röpke, & Berger, 2018)	20 months	School, higher education	Regional	Organisation of training.	Training for lecturers, teachers, and trainees from the region.
LOERSH (Kuttner & Dander, 2018)	18 months	School, higher education, continuing education	Regional	Training.	25 in school, 10 for media scouts, 3 for student teachers, 11 for higher education.
JOINTLY (JOINTLY, 2018)	18 months	School, higher education, continuing education, vocational education	Regional	Face-to-face and online meetings, community set up, legal and OER production booklet series, decision makers guidance.	Raise awareness and provide information on OER among the target group.
OERinForm (Langfelder & Berger, 2018)	20 months	Higher education	Regional	Planning a comprehensive consultation concept.	Raise awareness and provide information on OER.
ProOER (Ogurol & Richter, 2018)	24 months	Higher education	Regional	Courses.	Raise awareness and establish OER in higher education.
OERlabs (Becker, Hofhues, Bence, Reder, & Schiefner-Rohs, 2018)	18 months	School, higher education	National	Courses.	Raise awareness, provide training.
#OERcamp (Borski & Muuß-Merholz, 2018)	24 months	School, higher education, continuing education, vocational education	National	Organisation of OER camps.	In addition to OER camps, several projects and products have been created.
Edulabs (Neuschäfer, Kolbe, & Voigt, 2018)	18 months	School, education, educational training	National	Workshops.	Teaching didactic skills and participative forms of learning.
OER.UP (OER.UP, 2018)	18 months	School, higher education, continuing education, vocational training	National	Courses.	Training, networking, raise awareness, qualify distributors.
ÖWR	18 months	Continuing education,	National	Material production, training, courses.	Visibility in administration, raise

(Raffl et al., 2018)		vocational education			awareness, qualification.
OpERA (Dives, Gröger, Karl, & Novy, 2018)	16 months	Higher education, continuing education	National	Network events, Webinars, training courses.	Visibility, raise awareness, qualification.
OERinfoKIT (Waffner & Münzinger, 2018)	24 months	School, higher education, continuing education, vocational education	National	Assistance to disseminate and evaluate measures.	Reflexion tools, evaluation of measures.
OERinfo (Blees & Mollenhauer, 2018)	24 months	School, higher education, continuing education, vocational education	National	Creation of an online-platform as a central contact point for OER in Germany.	Central Internet platform for OER, development and dissemination of information material.

## Results

As the main result of the qualitative meta-analysis across all educational areas, Figure 1 illustrates how the codes for the two main classifications (i.e., lessons learned and design recommendations) were distributed.

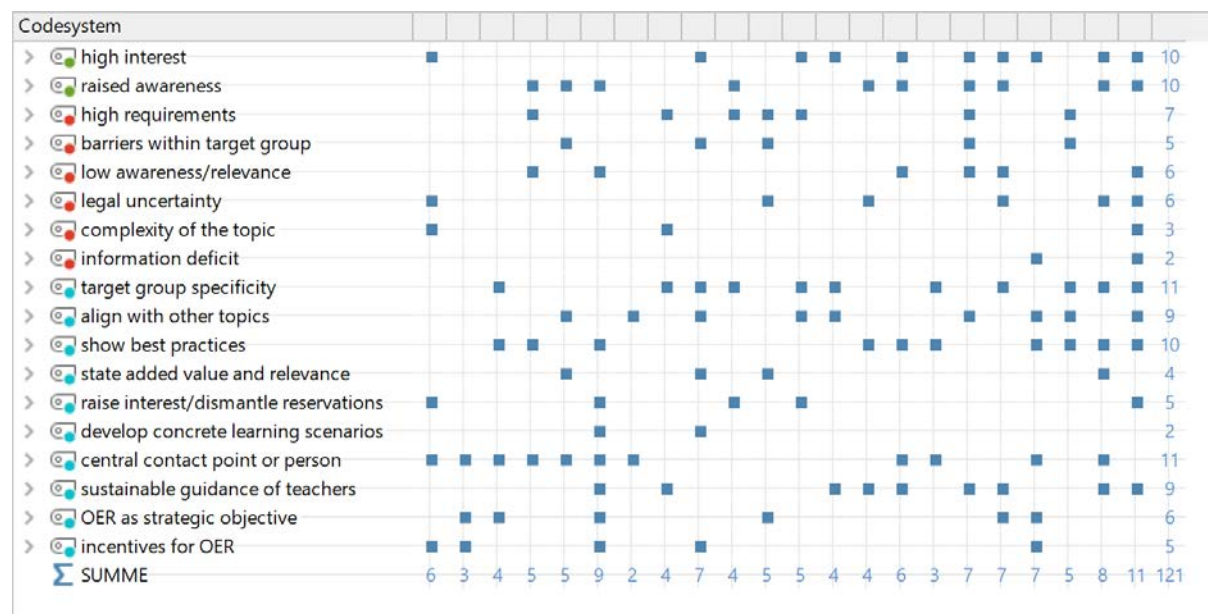


Figure 1. Overview of the coding for the meta-analysis.

Each code in Figure 1 represents the highest level of aggregation and describes all other codes subsumed under it. The green and red flagged codes refer to the projects' (positive and negative) lessons learned

(n=60) whereas blue flagged codes relate to the design recommendations (n=61) derived. The horizontal scores accumulate the total codes for each category (total n=121) while the vertical scores represent the sum of the codes for each of the 22 projects.

## Discussion

### Lessons Learned

Regarding the lessons learned, the results of the meta-analysis are at least twofold. On the one hand, the projects mostly state a high interest in OER and that the projects mainly accomplished raising awareness for OER. Exemplarily one project stated that in principle, the OER information event awakened awareness of the scope and complexity of the legal aspects involved in the production of teaching/learning materials (Use-oer@htwsaar, 2018).

This manner of perception is amplified by the activities implemented in the course of the project duration concerning find, use, create, share, and provision of OER. As shown in Table 1, the projects have managed to qualify hundreds of trainers and multipliers in various fields of education through courses, workshops and training, and many projects intended to anchor the topic of OER institutionally.

On the other hand, low awareness of OER was stated by six projects across all educational areas. According to Wieggers and Faber (2018) the creation and use of OER in Germany is still in its infancy despite the multifaceted measures of the last 18 months. Many teachers are not yet familiar with the term OER.

The high requirements for OER were identified as one of the key reasons for the limited use of OER. This lack of use encompassed, in particular, the creation of OER materials. Creative Commons (CC) licenses pose a key hurdle which participants must face in order to enable OER applicability. This aspect of CC licenses is also concomitant with the problem of legal uncertainties mentioned by six projects. Participants in OER training and workshops were hesitant about explicit debates on copyright and CC licences. Many uttered a fear of legal infringements and warnings (Lorenz & Preusse, 2018). These legal problems can be considered as a major obstacle that prevents many actors from working with OER. It also makes it challenging to spur participants to create and share OER. As the OpERA project indicated, for the field of higher education and continuing education, the associated implications of creating such a culture of exchange affect established and accustomed ways of working and above all, causes insecurity in the administrative apparatus (Dives et al., 2018). However, uncertainties mostly stem from the unfamiliarity of handling copyright issues and thus are mainly circumvented by compartmentalisation.

A distinctive feature of the OER projects was that they were engaged in various areas of education. These preconditions enabled the meta-analysis to derive statements about OER within different educational sectors. In the process of coding, specific barriers were identified that were mentioned by the projects related to their field of education. These statements were subsumed under the barriers in target groups code.

For schools, OER and open educational practices (OEP) found remarkable attention within the target group. At the same time, there is an immense information deficit about OER. However, once the contact

was established, there was usually an immediate interest to learn more about OER and its potential (Nestler, 2018). In the course of implementation with teachers, knowledge transfer, and cooperative and collaborative working methods, proved to be difficult (Waffner & Avseren, 2018). It turned out that forms of self-directed and autonomous learning were unusual concepts for participants. The full-time employment of teachers is another limiting factor (i.e., lack of time) as well as the fact that they do not usually have an office computer or workstation, or an office e-mail address.

Regarding higher education, students, teachers, and administrative staff had difficulties experimenting with new educational spaces beyond the usual range of teaching (Becker et al., 2018). However, a project working across educational sectors reported that in higher education, there is a need to engage with OEP (Bittner et al., 2018). In case of lecturers in higher education, the primary interest is in OER materials that are as small as possible rather than having complete modules or courses. This interest suggests that lecturers primarily strive to enrich their existing material or compile it individually according to their needs.

In vocational education, some projects were critical of commercial actors and regarding the topic of OER in general (Bittner et al., 2018). It appears that the idea of free and open educational material is sometimes difficult to reconcile with commercial interests. When interested in OER, there is a particular need for practice-proven, easy-to-use material.

In continuing education, the distribution of free materials and confidence in their quality, especially in the niches where most educators operate, is rather small (Lorenz & Preusse, 2018).

### **Design Recommendations**

In contrast to the lessons learned, which are rather ex-post and diagnostic, the design recommendations are intended to deliver forward-looking guidelines and strategies for the adaption of OER in education. Thus, they do not merely concern improved training, but correspondingly provide institutional considerations to amplify and spur the adaption and use of OER.

**Training and workshops.** In terms of improving training and workshops, the most striking results are to align OER with other topics. The projects' reports indicate that resonance was paramount in all areas of education when, for example, OER training or workshops were announced in conjunction with copyright law (Bittner et al., 2018). OER and the entire debate and movement around open access cannot perpetuate and diffuse into education as a detached phenomenon, but rather must be interrelated with various disciplines and future challenges, particularly in the context of teaching (Bremer et al., 2018). Embedding the discussion about OER in the broader context of media education and school culture is considered to be particularly crucial for further training of teachers (Kuttner & Dander, 2018). Such training can include explaining the significance of flexible, networked, collaborative, and open forms of learning in terms of space and time, which are enabled by the use of OER. Another example is one project which integrated OER into a course about design and production of digital learning materials that made it possible to establish a link to media didactics (Becker et al., 2018).

Notwithstanding that aligning OER with other topics might be fruitful, its added value and relevance need to be clearly stated. In this respect, diverse aspects can be highlighted. For example, the problem that teachers have little time to create teaching material can be countered with student-generated

content (Honikel, 2018). Another distinct advantage of OER is that teaching material is ready-to-use and thus time-saving which will also score points with teachers (Kuttner & Dander, 2018).

On a more fundamental level, many projects have made use of and recommend OER-related events as an anchor to exchange with teachers across the entire spectrum of teaching. This approach also offers an opportunity to encourage them to engage with the digitalisation of teaching and learning under the auspices of openness. In this manner, OER can diffuse into the more multifaceted theme of teaching and learning in a digitalising world.

A corollary of aligning OER with other topics is to show best practices of how to adopt OER in the different educational areas. Training and workshops should therefore not simply impart basic knowledge. In higher education, OER training needs to pinpoint typical problems that could be addressed through OER deployment, for instance, concrete situations in which the production and re-use of OER could bring added value for both teachers and students (Honikel, 2018). Further development of this approach is the provision of particular learning scenarios as recommended by two projects. Through the creation, use, and dissemination of OER in concrete research study projects as part of the curriculum, teachers and students can both become actors in open and participatory educational scenarios (Ogurol & Richter, 2018).

The target group specificity planning of training and workshops is another prevalent design recommendation. As already mentioned in the lessons learned, there is a need to cogitate about the target groups. A differentiated approach, as well as the customised design of information and qualification measures, is a prerequisite. Nevertheless, it seems necessary to reflect this consistently in the planning process. For instance, regarding teacher education, awareness and qualification measures should start as early as possible, to familiarise teachers with the use of OER in school (Lubna et al., 2018). Following this thought, each target group requires a specific design of an OER measure. The latter is also consistent with the recommendation to raise interest/dismantle reservations. The aversion that material produced contains errors also has to be alleviated (Dives et al., 2018). After all, science and research thrive from drawing new conclusions from mistakes.

**Institutional considerations.** As a dominant and cross-educational recommendation, the analysis yielded the suggestion of establishing a central contact point or person at the institutional level. Experiences in the projects demonstrated that institutions encounter problems when they are faced with the task of creating a legal and quality framework to enable or support open work, and specifically the use of OER. However, to trigger change, individual or group efforts are mostly insufficient. At a structural level, too, support units must be created that can signal to teachers or groups that their initiatives concur with the overall strategic alignment of the institution. The latter coincides with the recommendation of six projects to transform or elevate OER into a strategic objective.

Notwithstanding this approach, decision makers such as management and faculty heads should be involved in the development process or kept informed through communication (Ogurol & Richter, 2018). At lower levels, small steps can consist of creating incentives for adopting OER, such as the prospect of access to good audio and video material as a result of participating in training (Kuttner & Dander, 2018). Students, for example, can support OER through their committee work and provide cross-subject information (Dives et al., 2018). As incentives from the institutional level, OER could be incorporated as a topic area in appointment committees in higher education. Another project suggests the creditability of training for teachers (Nestler, 2018). Moreover, the inclusion of an OER perspective

in higher education seminars can be expeditiously realised within the existing framework in which such seminars take place.

The category of providing a central contact point or contact person is related to the suggestions that providing teachers with sustainable guidance is necessary to enshrine OER in the long run. This recommendation comprises both the technical aspects, as well as networks for the exchange of OER materials and experiences that have been formed as a result of the training. Of particular note, however, is the issue of copyright and the insufficient legal advice for teachers and lecturers which needs to be addressed (Use-oer@htwsaar, 2018).

## Conclusion and Recommendations

This article aimed to solidify the empirical basis regarding research on the adoption of OER in education utilising a meta-analysis. The latter was applied to surpass contextual and situational factors. The meta-analysis incorporated 25 OER projects in Germany of which 22 were part of the subsequent inquiry. Apart from the results, the mere number of projects and the achievements thereof indicates that OER is at least on its path to entering the mainstream in all areas of education.

The main analytical focus of the meta-analysis was on carving out generalised statements about the lessons learned, and to yield design recommendations for OER in education and the question of its adoption. This approach served to enrich previous studies, which are often more diagnostic rather than pragmatic-prescriptive. In this respect, the intent was to build a nexus between educational research and educational practice. Neither of the two is more entitled to guide the future development of OER; both must inform and enrich each other mutually.

The findings of the meta-analysis do not support the notion that there is one ideal way for adopting OER. As discussed, the findings reveal a mixed bag with which to stimulate the adoption of OER in education. Although interest in OER and the willingness to deal with OER can be confirmed by most of the projects, reservations are mainly rooted in the complexity of the topic, especially legal concerns. These findings widely resonate with results from other studies previously mentioned. Despite this, prior sectoral findings amalgamated with the findings from the meta-analysis indicate peculiarities encapsulated in each educational sector that require further research. However, reconciled with the diagnosis from present research and practitioners, the meta-analysis corroborates that OER is on the road to mainstream acceptance and can by no means be ignored in the context of teaching and learning in a digitalising world. Hence, to conflate OER with other pressing issues and to simultaneously emphasise its added value explicitly might be a promising approach. Single voices that call for replacing the label OER or using a synonym may be idiosyncratic for the case of Germany. Nonetheless, regarding mainstreaming OER, at least for the case of Germany, OER is receiving less attention than, for instance, massive open online courses (MOOCs; Fischer, 2014; Otto, Bollmann, Becker, & Sander, 2018; Sandeen, 2013). Subsuming or integrating OER as an aspect of existing educational training to increase awareness, is, therefore, another essential design recommendation.

Last but not least, the creation of a central contact point in institutions, regardless of its final design, to accompany and monitor actors on their path to OER, has proven to be an essential prerequisite. A promising strategy towards a successful implementation of OER is to operate perennially at both levels, institutional and practical, embracing all relevant stakeholders.

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