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Open to all, not known to all: sustaining practices with open educational resources in higher education

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General discussion

The main aim of this dissertation was to improve our understanding about teachers' adoption of Open Educational Resources (OER) within higher education. OER are resources that are released under an open license, are accessible at no-cost, and may be re-used, re-purposed, revised, and redistributed by others (UNESCO, 2020). The use of OER has the potential to improve teaching and learning in higher education. More specifically, it contributes to the Sustainable Development Goals, in particular on ensuring inclusive and equitable quality education in which resources are available to all (United Nations, 2015). Across the globe, many initiatives to share OER have resulted in numerous resources available for teachers and students to use. Yet, reuse of OERs appears to remain limited in higher education. Moreover, many OER initiatives tump out after the project funding ends and sustainable practices in which resources are continuously shared, reused, and updated are constrained. It is therefore crucial that we increase our understanding of how OER in higher education can be adopted and sustained. Therefore, four studies were conducted to provide insights into teachers' current practices with OER and their need for support to foster OER adoption (study 1), teachers' perspectives on quality of OER (study 2), and the community-based sustainability model (study 3 and 4). We choose to focus on the community-based model, because OER initiatives often originate from a small enthusiastic group of teachers, but must be cultivated to a broader community of both users and contributors so that resources are continuously shared, reused, and kept up-to-date. The studies in this dissertation contribute to fill the gap between the increment use of OER practices in higher education and limited empirical insights from research.

In this final chapter of the dissertation, we first summarize the main findings of each study followed by a discussion of the general findings. Then, the limitations of this dissertation are addressed and recommendations for future research are provided to further enhance our understanding on sustainability of OER initiatives. Finally, implications for practice are presented to further promote OER adoption, which can enhance openness in higher education and thereby contribute to realizing public value.

MAIN FINDINGS PER CHAPTER

Chapter 2. Teachers' adoption of OER in higher education

In the study described in Chapter 2, our objective was to gain insights into teachers' current practices with OER and their need for support to foster adoption of OER. The study took place in a large university of applied sciences in the Netherlands, which had no policies, incentives or services on OER. We used a mixed-methods design in this exploratory study, collecting data through a questionnaire and semi-structured interviews. The questionnaire aimed to examine the current state of affairs, and we received 143 fully completed questionnaires. To explore teachers' current practices in more detail and gain insights into their need for support, we conducted interviews with a purposeful sample of 11 teachers. The OER adoption

pyramid (Cox & Trotter, 2017), which emphasizes the interdependencies of factors that impede OER adoption, was used as the theoretical framework.

The analysis of the questionnaire and interview data implied that some teachers use OER in their teaching, but only minimally. It is important to stress though that this finding could be influenced by what is known as 'dark reuse' (Wiley, 2009). Teachers may unconsciously engage with OERs by using resources from other sources such as colleagues or previous courseware, without realizing these are OERs. This limited conscious use of OER is partly related to a lack of awareness of the defining characteristics of OER, since most teachers in our study do not know where to search for OERs or how to recognize them. Most teachers think that OER are an equivalent to digital resources available online. Consequently, teachers do not make use of the possibility to retain resources or to revise or remix them so that these align with their specific context or needs. Thus, teachers mentioned that they tend to use resources 'as-is' to supplement existing curricular content. Sharing resources, however, happens often, although mainly without an open license as teachers primarily share on a local level within their team or school.

Teachers' need for support to foster OER adoption was derived from the analysis of the interviews. We discerned ten facilitating support mechanisms which we grouped in three overarching themes: availability, capacity, and institutional support. The first theme, availability of OER, related to teachers' need for support to find OER. Almost all teachers indicated that they would be helped if they could receive an overview of available OERs within their teaching subject. Availability of relevant OERs could also be improved through collaboration in teacher communities with peers, both on an institutional level as on a national level with other universities, because curricula are often quite similar across schools and institutes. The second theme concerned teachers' capacity to use or share OER because even if teachers have access to relevant OERs, several teachers stressed that pedagogical and technological support must be available. To integrate OERs within their curriculum, support could be organized by on-the-job support or through formal training sessions. The third theme, institutional support, consist of teachers' need of facilitating conditions to increase OER adoption. Currently, teachers are uncertain about what is allowed in relation to sharing and using resources. Communicating guidelines, for example through a vision or a policy on OER, could support teachers in knowing what is allowed when sharing and reusing resources.

Chapter 3. Would you use them? A qualitative study on teachers' assessments of OER in higher education

In Chapter 3, we illustrated how teachers assessed 'big' OERs (i.e. institutionally generated resources designed with explicit teaching aims) on quality, and whether changes occurred in teachers' perceptions of OER by means of collaborative dialogue about the quality of these resources. In this qualitative study, a total of 11 teachers participated who were all working at the same university of applied sciences. Teachers were divided into three groups based on the subject they teach: business analytics, intercultural communication, or research methods. These

subjects were chosen because they are taught across several schools within the institute. Each subject group consisted of three or four teachers, and came together once to discuss several OERs that were provided by us. Additionally, individual interviews were scheduled with teachers before and after the plenary meeting, in which they were asked to create association maps on OER and to share their experiences, if any, with the use of OERs in their teaching.

We identified five themes that cover the range of elements that teachers mentioned in their assessments of the provided OERs. The first theme related to the *content* of the resource which teachers assessed for relevance, scope, correctness, structure, and the alignment of the depicted context with students' future professions. The second theme related to the *design* of the resources. Teachers examined the pedagogical design of a resource and whether it matched their teaching approach. Moreover, to motivate students to use the resources, they also reported OERs should be attractive and offer a mix of learning modalities. Teachers also studied the granularity, the developer, and the production date of the resource. The third theme, *usability*, referred to the way teachers assessed and valued OERs on layout, ease of navigation, and utility from a student perspective. Teachers valued ease of access and gaining insights into students' progress, in particular. The fourth theme, *engagement*, related to the value teachers assigned to opportunities for students to interact with the resource. Teachers appreciated exercises, either with or without automated feedback mechanisms, the availability of videos to engage students, as well as other provided interactive features of the resources. The last theme referred to the *readability* of the resources. OERs should have concise, to-the-point text that is not too academic, especially for resources that are not in students' native language.

Additionally, we investigated if teachers' perceptions of OER changed. We did this by comparing their pre and post association maps and by analysing the data of the concluding individual interviews. Three main themes emerged: (i) awareness regarding OER changed from a limited or shallow understanding to an increased understanding of its defining characteristics and licensing mechanisms; (ii) teachers' attitude changed from doubtful preconceptions regarding quality to an appreciation of the value OERs could have for their lessons; and (iii) practical issues remained a concern but changed from uncertainty and questions around practical issues involved in using OERs, to an understanding of the actual implications of these issues due to their experience with OERs.

Overall, teachers were quite impressed by the quality of the resources and some of them also shared resources with their colleagues. Yet, only three teachers actually reused resources in their teaching, mostly as additional resources. Teachers indicated difficulties with implementing OERs in ongoing courses due to the effort and time to fit the OERs to their needs as well as to their current course design. Consequently, we recommended higher education institutes to encourage conversations on OERs within teacher teams during curriculum reforms. During such meetings, it is important that support staff should be available to answer questions teachers might have about the concept of OER as well as to help teachers

to adapt (parts of the) resources to their instructional needs and their specific teaching context.

Chapter 4. The role of brokers in cultivating an inter-institutional community around open educational resources in higher education

The final two studies were conducted within the context of an inter-institutional community on OER. This community, called *Together Nursing*, involved 15 universities of applied sciences in the Netherlands that offer a Bachelor programme Nursing. The purpose of the community was to collaborate and share practices, knowledge, and OERs. However, OER initiatives often struggle to become sustainable once funding ends due to decreasing user engagement (Orr et al., 2015). To cultivate the user group, brokers play an important role within distributed communities in which ties need to be established to connect several local groups into one community (Wenger et al., 2002). Brokers are individuals who facilitate transfer of knowledge and resources, and coordinate efforts across organizational boundaries (Akkerman & Bakker, 2011). Brokers are defined by their role rather than their organizational position.

In Chapter 4, we specifically focused on this role of brokers in cultivating the inter-institutional community. In this qualitative descriptive study, we used cultural-historical activity theory (Engeström, 1987) to understand the complexities associated with this role of brokers. Qualitative data were collected which included project documents, process reports, reflection reports and an online focus group. The inter-institutional community aimed to create a sustainable collaboration between institutes on sharing practices, knowledge, and OERs. Brokers undertook several actions to endorse this objective, which we grouped in four focus areas: (i) encouraging teachers to engage with the inter-institutional community; (ii) stimulating the use the OER repository; (iii) stimulating the use the online community; and (iv) creating the necessary organizational structures within the institutes. Brokers concluded that, a small-scale, personal, and content-oriented approach to encourage teachers to engage with the OER repository and the online community was perceived as the most valuable, although a wide range of instruments were needed to foster the transition to the new collaborative practice across institutes. Brokers were positive about the necessary conditions that they had created within their institutes that would contribute to the new activity system. For example, collaborations with libraries were initiated, or engagement with the inter-institutional community became part of HR interviews. Brokers' actions had impact because more and more teachers started using the OER repository and the online community, and there was a widespread enthusiasm to collaborate. Moreover, brokers mentioned that barriers between institutes diminished, resulting in a strengthened collaboration across institutes. Their actions also impacted practice in unexpected ways. For instance, some noticed that teachers gained an increased awareness of the curriculum outline, and other brokers stated that the adoption of the common quality model led to more conversations on the definition of quality by the institute's curriculum committee.

Nevertheless, brokers experienced several role conflicts. For example, brokers felt that their actions had not led to a major transformation of the teachers' way of working. The use of the inter-institutional community to exchange knowledge and resources was still limited as only a small number of teachers actively participated. Moreover, brokers struggled with the ambiguity and responsibilities of their role. For example, they experienced the burden of realizing the formulated objectives without the commitment of the team and with limited or no managerial support. Moreover, brokers were also impacted by several organizational constraints they were confronted with and had limited capacity to counteract these. Reorganization, personnel changes, and the impact of Covid-19 were all factors that diverted the focus from spanning boundaries between institutes.

Chapter 5. What's in it for me? A mixed-methods study on teachers' value creation in an inter-institutional community on OER in higher education

Inter-institutional communities on OER can only exist if teachers feel that participation gives them value; otherwise engagement will decrease and the community might cease to exist (Wenger et al., 2002). Thus, for the longevity of a community it is important that teachers keep engaging with the community so that knowledge and resources are continuously being shared and kept up to date. In Chapter 5 we sought to illustrate teachers' valuing of their participation in the community. A mixed-method design was employed in which we collected user statistics, administered a questionnaire, and conducted semi-structured interviews with four teachers. The Value Creation Framework (Wenger et al., 2011) was used to analyse our data which enabled us to illuminate 'the added value *for* community members as defined *by* community members' (Dingyloudi et al., 2019, p. 217). To create an account of value creation, we analysed the data and created personal and collective narratives which were further analysed on the five defined cycles of value creation (Wenger et al., 2011): *immediate value* are activities and interactions that have value in and of themselves; *potential value* is knowledge value that has the potential to be realized later; *applied value* relates to changes in practice as the potential knowledge capital has been leveraged to change practice; *realized value* represents performance improvement; and *reframing value* refers to the redefinition of success at the individual, collective, and organisational levels. By combining data we were able to formulate and illuminate teachers' valuing of their participation in the inter-institutional community, both with personal narratives (interviews) and collective narratives (user-statistics and questionnaire).

The findings of our study illuminated that value, traversing all five value cycles, was created in the inter-institutional community. The quantitative data mostly highlighted the immediate value. In the period between the start of the project in 2018 until mid July 2021 (six months after the official end of the project), a total of 1458 resources were shared in the repository, including third party resources. The total number of members of the online community gradually raised to 891 users in July 2021. In total, online community members created 586 posts and received 789 comments and 907 likes. The highest number of activities relate

to the chat messages: the online community groups sent 1557 chat messages. This data showed us that participation continued after the official end of the project. In general, by combining quantitative and qualitative data, it became clear that major value creation occurred from teachers' personal needs, resulting in dominant immediate and potential values. The inter-institutional community provided a range of benefits to the teachers, including the opportunity to network with other professionals, access new resources and ideas, collaborate on projects, and receive aid during emergency teaching. Some teachers changed their practice by reusing OER in their teaching or by creating new practices with peers from other institutes. Less realized and reframing values were identified in our data. It could be that it was too early to discern these values because teachers were still getting acquainted with the community, or that teachers did not yet articulate these values as it required them to reflect upon abstract notions of success.

We recommended inter-institutional communities to use The Value Creation Framework (Wenger et al., 2011) to look forward and examine how additional value creation can be promoted. Moreover, to further endorse the sustainability of an inter-institutional community, it is vital to link the activities and connections that teachers deem valuable, the 'what's in it for me', with the burning issues of the organization(s) to realize the necessary managerial support to continuously facilitate space for teachers to learn from each other.

DISCUSSION OF GENERAL FINDINGS

The studies described in the chapters were conducted to increase our insights into teachers' adoption of OER and the sustainability of OER initiatives in higher education. In the current section, we elaborate and discuss four conceptual contributions of this dissertation to the domain of OER.

Teachers' assessments of OER

Poor discoverability of quality OER has been an ongoing bottleneck that impedes adoption of OER by teachers (e.g. Luo et al., 2020). Indeed, similar concerns were also mentioned by teachers in Chapters 2, 3, and 5 of this dissertation. Teachers experienced concerns, for example, related to the time and effort to search, find, and evaluate resources; teachers' attitude regards the value of OER (e.g. free cannot be good); or the granularity of OER (e.g. too little). To better understand concerns regarding OER quality, previous research examined teachers', reviewers', and students' perspectives, but mainly with quantitative measurements (e.g. Cuttler, 2019; Fischer et al., 2017; Kimmons, 2015). Hence, in Chapter 3, we contributed to these insights by presenting a qualitative study on teachers' assessments of 'big' OERs on quality. Five main themes were elicited from teachers' collaborative conversations when assessing 'big' OERs: content, design, usability, engagement, and readability. Our findings showed that teachers, without any provided support, already take into account almost all of the quality elements that are mentioned in rubrics to assess the quality of OER. This suggests that providing assessments rubrics, such as the Framework for selecting OER on the basis of

fitness for purpose (Jung et al., 2016) or the Instrument for Quality Assurance of OER (Zawacki-Richter et al., 2022), may support teachers to assess an OER, but are not key instruments for teachers to determine the quality of OERs for their own teaching.

Moreover, apart from quality concerns, teachers did not adopt OER due to issues with implementing them in ongoing courses. We therefore strongly suggest to underpin the usability of OER during curriculum reforms or course transformations, as in line with previous research (e.g. Schuwer & Janssen, 2018). One specific way to increase reuse of OER during such reforms is to let teacher teams collaboratively assess relevant OERs. In Chapter 3, the findings indicated that the conversations on OERs with peers changed teachers' perception of OERs: it not only increased their awareness of the defining characteristics of OER, but also changed their attitude regarding the value of OER for their lessons, and provided insights into the practical issues when using OER. Offering support during such meetings is vital (Huizinga et al., 2014), especially from librarians and educational technologists to overcome issues with regards to the '5R' characteristics of OER. Moreover, support staff can help teachers to take into account elements that they did not take into consideration when assessing OERs such as the particularities of the open license, the technical compatibility for reusing the resource, and the accessibility of the resource for students with learning disabilities.

Teachers' perceived availability of OER

Teachers' assessment of a given resource in relation to the anticipated use of that resource defines the perceived availability of OER (Cox & Trotter, 2017). From this dissertation, it became clear that the perceived reusability of a resource in relation to the teacher's specific context significantly determined their volition to reuse a resource. The findings in Chapter 3, for example, indicated that teachers often assessed OERs 'as-is'. Teachers often do not know the resource may be revised to fit their specific needs. This inexperience with OER was also illustrated in Chapter 5, which showed that teachers were unsure what is allowed when reusing resources. Indeed, reusing OER in different contexts and in different ways is a known experienced difficulty (Schophuizen & Kalz, 2020).

The '5R' characteristics enable teachers to adapt resources to their specific contexts, but in Chapter 3 we derived from teachers' assessments that they mainly assessed resources 'as-is'. Teachers sometimes discarded resources because, for example, the pedagogical design did not fit the learning approach they were using, or the content and the provided examples within the OERs did not align with students' future professions. Yet some teachers argued that it would be impossible to design OERs that align with all contexts. Furthermore, the perceived availability of OER was heavily impacted by the language of a resource. All OERs except one that were collaboratively assessed in Chapter 3 were in English. For some teachers this meant that it was not usable by default whereas other teachers believed students should be able to use English resources, but thought that the English used on most OERs was too academic. This issue has previously also been

documented for Chinese (Huang et al., 2012), Italian (Banzato, 2012), and Spanish and Portuguese students (Cobo, 2013). Most OERs require students to have an advanced proficiency level of English, but students' English literacy skills as non-natives are often not sufficient for understanding course content of OERs (Rets et al., 2023). This is also the case for Dutch students at universities of applied science, since they have limited skills to engage with English resources (Beeker, 2012). In relation to readability, we could conclude that 'the gap between many potential OER learners' abilities and the learning materials that purportedly enable inclusive education' (Rets et al., 2023, p.14) should be addressed within discussions on OER adoption. Moreover, although the potential of artificial intelligence (AI) to overcome challenges regarding OER adoption has already been investigated (Tlili et al., 2021), the possibility of using AI to improve the readability of OERs were not discussed. We argue that using AI could be an effective and an easily accessible way to translate and simplify OERs.

One of the advantages of OER, however, is that teachers may adapt and revise the resources to overcome these issues. For example, to mitigate the readability issue, text simplification of OERs has proven to make them available and effective for students with a wide range of English proficiency levels (Rets & Rogaten, 2021). With respect to the relation of the content with students' future professions, teachers can add profession specific content and examples to the resource, because students prefer education in which empirical issues are discussed that relate to their future profession over theoretical arguments and conceptual topics (Cavallone et al., 2022). Consequently, to improve the perceived availability of OERs, more emphasis should be placed on the revisability of OERs by facilitating support and by increasing teachers' awareness, knowledge, and skills to revise resources to their specific context and needs.

Cultivating inter-institutional communities on OER: The role of brokers

Inter-institutional communities can be a means to promote awareness on and sustainability of open education as knowledge and resources can be shared with peers within the same domain across higher education institutes (Schophuizen & Kalz, 2020). A community however, does not evolve without effort, and brokers have the important and challenging role to cultivate such an inter-institutional community on OER. Brokers should be able to span boundaries across higher education institutes, and to strategically deploy their activities over time, throughout the development of interorganizational relationships (Obstfeld, 2017; Williams, 2002). Our findings in Chapter 4 highlighted the diversity of actions that brokers undertook, the perceived impact thereof, and the conflicts they experienced. Yet, becoming a competent broker requires certain competences as well as experience with spanning boundaries. And although experience comes through time, communities and institutes can also support brokers in their role.

Within our context, brokers were defined by their structural position within the institute (e.g. being one of the teachers) and given responsibilities (e.g. to engage teachers, and create supporting conditions within their school). In addition

to the brokers' structural position to be able to connect several groups, brokers also needed to have social dexterity and perseverance, because creating sustainable change in higher education requires time and perseverance as there will be resistance among colleagues to the change (Van Genugten, 2022). Cultural-historical activity theory (Engeström, 1987) provided us with a valuable conceptual framework to not only analyse the complex context brokers operated in, but to also explore the conflicts they experienced and the origin thereof. Surely, the findings showed that brokers experienced conflicts such as limited willingness among teachers to share resources, a high enrolment of students resulting in large numbers of new teachers, and the pressure of the stipulated responsibilities of their role. These conflicts evolved from the demanding context they were operating in, the ambiguity of their role, and the organizational constraints they were confronted with. Few studies on boundary spanning have been conducted within an educational setting, but the findings from our study are in line with known factors that impact boundary spanning behaviour (e.g. Van Meerkerk & Edelenbos, 2018). It appears that encountering conflicts is inherent to the role of broker.

It is important to note that depending on the situational demands and personal capacities, the tasks of boundary spanners can be combined in a profile of fixer (aligns organizational policies with external processes), bridger (encourages cross-boundary endeavours), broker (facilitates and mediates interactions and dialogues), or innovative entrepreneur (looks for new ideas, products, and processes) (Van Meerkerk & Edelenbos, 2018). Although our main focus was on the role of brokers, bridgers and brokers could complement each other in spanning boundaries (Van Meerkerk & Edelenbos, 2018). Bridgers are persons that have a leadership position and concentrate on creating partnerships across institutional, organizational, and community boundaries by connecting people and resources (Van Meerkerk & Edelenbos, 2018). Bridgers mainly operate at the strategic level, whereas brokers function at the operational level (i.e. more hands-on) by engaging with teachers and other stakeholders within their institute. We deem a close collaboration between bridgers and brokers as beneficial, because connecting bridger and broker roles in inter-institutional communities on OER might mean that potential conflicts are dealt with at the appropriate level.

Furthermore, prior research examined the particular skills, experience and personal characteristics that boundary spanners need to have (Williams, 2002). To be a competent boundary spanner, a set of cognitive, social and emotional competences (see Table 6.1) need to be mastered (Van Meerkerk & Edelenbos, 2019). Training trajectories to develop these competencies, especially the social-emotional, can support brokers to acquire a sufficient level of competency to be able to fulfil their role effectively (Van Meerkerk & Edelenbos, 2019). For example, brokers' peer-mentoring programmes could be a method to enhance boundary spanners skills through a combination of problem-based sessions, peer review sessions on experiences and conflicts, and mentors that are available to discuss issues regarding realizing change (Clark et al., 2022). Moreover, role-playing games such as 'taking-the-role-of-the-other' or 'triangles' to experience that there

is limited control on the dynamics of the entire activity system, can clarify and illustrate the complexity of boundary spanning while simultaneously providing opportunities to further develop emotional competences (Van Meerkerk & Edelenbos, 2019).

Table 6.1

Boundary spanning competencies (Van Meerkerk & Edelenbos, 2019)

Category of competence	Specific types of competencies
Cognitive	Information processing Content expertise Analytical thinking
Social	Communicative Conflict management (Inter-)organizational awareness Political savvy
Emotional	Empathy and otherness Self-efficacy and self-confidence Self-monitoring and self-awareness

Lastly, in the inter-institutional community, sociotechnical platforms were available (see Chapter 5). These platforms can support brokers in spanning boundaries as these make resources widely available and instigate relations between users (Lawlor et al., 2021). Yet, our findings also indicated teachers' preferences of face-to-face contact to get to know teachers across institutes so that they know with who they are collaborating online. This combination of face-to-face and online activities to cultivate teacher engagement in communities has also been stressed by others (e.g. Van Beemt et al., 2018; Eaton & Pasquini, 2020).

Cultivating inter-institutional communities on OER: Value creation

Brokers' actions to create the important conditions that support collaboration across boundaries will, however, be futile if teachers do not experience value in engaging with the inter-institutional community. In Chapter 5, we therefore explored and illustrated the value that teachers perceived by using the conceptual framework of value creation (Wenger et al., 2011) as an analytical framework. The findings that emerged from the analysis showed that value creation mainly occurred based on teachers' personal needs. Teachers experienced value because their participation in the inter-institutional community resulted in access to ideas, tools, and resources of others; it led to inspiration to create resources or to present teaching content in alternative ways; it provided validation of their teaching as they could see teaching approaches and resources of others; it gave them confidence in their own resources as they could compare their own work with that of others; it provided a way to make connections with peers; it was a means to easily find support during emergency teaching; and it resulted in new collaboration projects across institutes. Our findings are in line with insights of previous studies that illustrated the diversity of value that teachers attributed to their engagement in teacher communities

(Boada, 2022; Booth & Kellog, 2015; Dingyloudi et al., 2019). To sustain engagement within inter-institutional communities, Booth and Kellog (2015) and Boada (2022) emphasized the need to periodically communicate to teachers how and why the community could support their work. Therefore, we suggest to frequently evaluate value creation by analyzing statistics or by talking to teachers, and to actively feeding it back to the community to further promote engagement.

To create an account of value creation, both personal (e.g. the experience of the teachers) and collective (e.g. the developed identity of the community) narratives can be collected. Two functions of these narratives must be considered (Wenger et al., 2011): the ground narratives are stories of teachers about the past and the everyday life of a community, whereas the aspirational narratives are stories about what the community is expected to produce, which evolves over time. It is within the interplay between these narratives that a space for learning is created and teachers decide for themselves what is worth learning. To evaluate value creation over time, a variety of data could be collected throughout the development of the community, both on short- and long-term value. In Chapter 5, the mix of quantitative data and semi-structured interviews was a valuable method to illustrate the diversity of value creation as well as how value creation traversed the different value creation cycles. However, rather than applying time-intensive methods such as semi-structured interviews, the templates for value creation stories (Wenger et al., 2011) could be used by project managers of communities to collect stories of teachers. The insights thereof can be complemented by aggregated quantitative data of any digital platforms that are used within the community. To simplify the data collection process, it would be especially beneficial if quantitative measurement tools are created that lowers the threshold for teachers to participate and share their experiences. To conclude, we argue that the longitudinal evaluation and the communication of the value creation stories, including real-life examples how the community can support teachers' work, can contribute to creating a sustainable inter-institutional community on OER.

Even so, it is vital for communities that there are members who actively contribute, engage, and help others (Hernández-Soto et al., 2021), but communities often have a relatively small group of active members while peripheral participation (i.e. members who make use of the community but not manifest themselves) is more common (Maciá & García, 2016). A social perspective in which collaboration is part of teachers' profession could increase engagement in communities (Van den Beemt et al., 2018). It might be necessary to move the most frequently asked question of 'what's in it for me?' to 'what's in it for us?' as to not only stress the individual value of OER communities (such as access to resources, help with challenges, connection with peers), but to also highlight the public values (such as equitability, inclusivity, accessibility). Yet, to realize structural change on a wider scale, the values, structures, and activities of open knowledge should become embedded into the DNA of every higher education institute so that knowledge and resources work for the benefit of all (Montgomery et al., 2021).

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This dissertation has some limitations, which relate to (1) the specific context of the studies, (2) the lack of longitudinal research, (3) the impact of Covid-19 on data collection, and (4) limited insights into actual classroom practices. These limitations are discussed and several recommendations for future research are provided.

The first limitation relates to the scope of this dissertation as it was limited in terms of context. Not only were all four studies conducted within universities of applied sciences, but also the specific context of the inter-institutional community in the last two studies, could limit the generalisability of these results. For instance, teachers' need for support (Chapter 1) and perceived quality of OER (Chapter 2) might differ for teachers working at research universities. It is possible, for example, that the need for OER to relate to students' future profession or the level of English, might be less of an impediment for reuse at research universities due to the more academic focus. In addition, it stands to reason that the conclusions derived from the findings of the studies on the inter-institutional community on OER (Chapter 4 and 5) cannot be directly translated to other contexts outside nursing or the health sciences. Further work is required to establish the viability of our findings within different contexts, especially in relation to the potential of inter-institutional communities on OER. To develop a full picture of the community-based sustainability model, additional studies within different educational contexts will be needed that explore antecedents, potentials, and challenges.

The second limitation relates to the need for longitudinal research. In this dissertation, data were collected within a specific time-frame, and often with a retrospective approach. These exploratory research studies were essential before being able to embark on the challenging and time-intensive endeavour of longitudinal research. With the insights provided, longitudinal research could be designed to create a better understanding of sustainability issues of community-based OER initiatives. We argue that the third-generation of cultural-historical activity theory (CHAT) (Engeström & Sannino, 2021) could be a helpful conceptual framework to analyse the transformations within and between activity systems in community-based OER initiatives. Whereas we were only able to discern perceived conflicts within the activity system (see Chapter 4), longitudinal research designs would enable researchers to identify, analyse and provide solutions for contradictions (i.e. structural tensions within and between activity systems). Additionally, whilst we focused on the perspective of brokers, CHAT enables and encourages researchers to analyse and include the conflicting and complementary groups in the activity system, because 'expansive learning is an inherently multi-voiced process of debate, negotiation and orchestration' (Engeström & Sannino, 2010, p. 5). Hence, longitudinal research designs in which different types of data are collected and analysed during the development of inter-institutional communities would be extremely valuable as it could lead to a better grasp of its dynamics such as forms of participation, and short-term and long-term value. For instance, a multi-year study could examine the development of the intended

transformation in the activity systems through videotaping meetings of project leaders, interviewing teachers, brokers, managers, and other stakeholders regularly about their experiences and perspectives on the intended transformation, and conducting regular quantitative measurements within the community either through downloading user statistics or with short surveys. More specifically, we would welcome longitudinal research designs in which brokers are observed, shadowed, and interviewed to expand our understanding of their actions, conflicts, and mastery of brokering competencies.

The third limitation is a derivative of the Covid-19 pandemic, because the studies presented in Chapter 4 and Chapter 5 were adapted due to the difficulty of collecting data during the pandemic. Not only was everyone overwhelmed by the sudden change to online teaching, many teachers -who also were practicing nurses- also helped out in healthcare. The effect hereof was that it was difficult to find teachers and brokers who were willing to participate in our studies. In the end, to overcome this sampling issue, the research designs were adapted to include quantitative data as well which provided us with varied and rich insights.

The fourth limitation relates to the fact that all four studies mainly relied upon self-reported data of teachers and brokers. Although these data enabled us to understand their support needs, perceptions, and experiences with OER, which contributed to our main aim to gain insights into OER adoption, no study was included that explored teachers' actual teaching practices. It would be beneficial to extent research to not only examine how teachers assess resources (Chapter 3), but to also examine how teachers select, adapt, and position resources in their curriculum (Leighton & Griffioen, 2021). Since the revisability of OER is important to ensure a fit with teachers' context, future research could learn from studies that focus on teachers as designers of learning and instruction (see Warr & Mishra, 2021). Further studies could, for example, observe teachers' design talk during collaborative course design (Boschman et al., 2015) to explore the decisions teachers make when reusing OER. Additionally, it would be of interest to include students' perspectives on OER quality and reuse, because they are the one using them in their learning. This could include students' perspectives on quality OER, their preferences for different types of OER (e.g. 'big' OERs and 'little' OERs), its usage in education (e.g. as a core resource or as an additional resource), and the impact of language of OER. The latter is especially of interest for non-English speaking countries. In the Netherlands, 72% of Dutch high school students indicated that their English proficiency would be sufficient to study at a university of applied science, but at the same time 38% stressed that their proficiency of English is insufficient to exclusively use English textbooks (Beeker, 2012). Due to the ongoing internationalization of society and the influence of globalisation over the past decade, we need to re-examine their perspective on this issue and explore to what extent this might be influenced by whether or not resources are openly and freely available to them.

IMPLICATIONS FOR PRACTICE

Several practical recommendations can be derived from the findings, some of which are, also based upon previous sharing of our insights, already being taken up within Dutch higher education.

Teachers' use of OER should be supported

Over the years, several competency frameworks have been created to indicate skills and knowledge teachers need to successfully adopt OER. For example, the European Framework for the Digital Competence of Educators (Redecker & Punie, 2017) describes proficiency levels to (i) select, (ii) create and modify, and (iii) manage, protect and share digital resources. The OER competence framework (Grégoire & Dieng, 2016) describes the specific competencies teachers need in relation to the OER life cycle: a total of 38 specific competences are formulated in relation to awareness of, searching for, using, creating, and sharing OER. All these specific ins and outs of OER could be quite intimidating for teachers who already stress a lack of time and a high workload as major barriers for delivering high-quality education (e.g. Dicker et al., 2019; Schophuizen & Kalz, 2020; Janssen & Van Casteren, 2021). We therefore advocate, like many others, that teachers should be supported by librarians and educational technologists in the OER re-use phases of searching, adapting, and sharing OER as these phases comprises complex copyright and open licensing issues. This support could delimit the potential barriers teachers might perceive to explore the opportunities of OER for their teaching.

Additionally, we especially see value in exploring OER collaboratively in teacher teams during curriculum reforms, because teachers indicated the difficulty to adopt OERs in running courses. Within these reforms, alongside the mentioned additional support of support staff, sufficient time for teacher teams should be allocated to collaboratively explore and discuss the possibilities and opportunities OER might offer. Time that is needed so that teachers can collaboratively explore the potential of specific OERs for their teaching, to align them with their learning objectives, and to adapt them to their specific contexts.

Increase awareness of OER among teachers

The findings in this dissertation showed teachers' limited awareness of OER, which impacts the acceptance and use of OER. Due to the increasing importance of OER in higher education, knowledge about this concept should be integrated in faculty development programmes (Schophuizen et al., 2021). We therefore suggest that higher education institutes should integrate the concept of OER in university teaching qualifications. Through this, novice teachers will obtain an improved awareness of the concept of OER and gain some experience with using OERs in their teaching. Likewise, we recommend teacher education programmes to include the concept of OER within their curricula so that the awareness among novice teachers in primary and secondary education will expand as well. For expert teachers, the mastery of OER competences must have a direct relation to their professional practice as this is essential for effective teacher professional

development (Van Veen et al., 2010). Thus, we recommend to provide faculty development on OER when they design or revise courses. Hence, by integrating OER within teaching qualifications, in curricula of teacher education programmes and faculty development, a broad awareness of OERs can be established.

Apply quality assurance mechanisms on OER

Quality has been a known impediment for adoption of OER, and in this dissertation this aspect has indeed been mentioned by teachers as a concern. We want to stress however, that it is not the 'open' determinant that governs the discussion of quality. It is simply the fact that there is a vast number of OER with varying quality since many are shared without quality assurance as opposed to the smaller number of closed resources that make more use of formal quality assessment processes before publication. We therefore see an important role for quality assurance mechanisms when initiating inter-institutional communities on OER to overcome concerns of OER quality.

To ensure that OER communities create and share resources that teachers deem relevant and of good quality, beginning communities should start with exploring teachers' need for resources. We advise the communities to (i) gain insights into teachers' and students' preferences for OER in their teaching; (ii) to create a shared vocabulary so that resources can be connected to a common standard; and (iii) to collaboratively create an accepted quality model that be used to peer-review OER before publication. Subsequently, when designing and sharing OER, there are four moments in the OER life cycle when quality assurance can be nurtured (Zawacki-Richter et al., 2022): (1) the content can be evaluated by experts and (2) a connection with common standards can be made during the development of the resource; (3) peer-review can be conducted immediately before publishing the resource as OER; and (4) the resource can be assessed by users after its publication. These quality processes were implemented in the inter-institutional community on OER that we examined in Chapter 4 and 5: New resources were created in a collaboration of teachers from different institutes (1); resources and the search engine were related to the common language of the curriculum which made it easier for teachers to search for relevant OER (2); resources that met all quality criteria received a quality mark from an independent assessor (3); and resources were assessed by users within the repository (4). Yet, peer-review was optional and not all resources were screened against the formulated quality model. So, resources were still not always perceived as sufficient, and moreover, teachers were not aware of the quality mark that were awarded to high-quality resources. Thus, we suggest that inter-institutional communities on OER should emphasize and highlight the quality procedures that are employed within the community. Moreover, after the essential initiation phase, where the focus is on quantity over quality to ensure that there are OER to be found, communities should find a balance between quantity and quality (e.g. define a minimal level of quality assurance) so that teachers will return to search for relevant and quality resources.

Promote OER in the first academic year to foster equality, flexibility, and accessibility

Additionally, we want to stress the advantages of OER for students' benefits. Currently, the most dominant model for course resources is that a teacher defines which materials students should buy. The expectation is that soon there will be a shift to alternative models in which publishers, students, teachers, institutes, content-, platform-, and EdTech providers make it possible to create an optimal mix of both open, semi-open and closed resources (De Jong & Van den Berg, 2022). These alternative models could increase students' access to course materials and thereby contributing to the Sustainable Development Goal 'quality education' (United Nations, 2015). Inequity is a concern, and students' financial situation is an increasing issue in higher education. Some students simply cannot afford buying course materials (Martin et al., 2017; Wittkower & Lo, 2019) and others decide to save money by not buying the recommended course materials. Also, costs of course materials might form a barrier for some students to switch studies (NOS, 2022). We therefore are interested to explore the possibility of OER zero-cost courses in the first year of higher education programmes. This could enhance equality, flexibility, and accessibility, because resources will be available without costs to all, teachers may adapt the content to add context and diversity, students can use a variety of OER to shape and support their learning, and requirements for accessibility can be integrated for students with disabilities.

We suggest to explore OER use in the first year of higher education because most courses across institutes share similar content. Institutes or teachers could collaborate on a national level (e.g. in inter-institutional communities) to create, revise, or remix OER for more generic courses. Subjects like introduction to research, communication, academic writing, psychology, physiology, or mathematics, to name a few, are taught across a wide range of educational programmes. OER can be created collaboratively, or existing OER could be adapted to the local context. For example, OER can be either translated to students' native language or revised to simplified English; and context specific examples can be added to align it to students' future professions. Complete zero-cost degrees has proven to be beneficial for students' access and learning (Hilton, 2016), but we recommend to first explore the possibility to include OER within the more generic courses in the first year. These experiences can be used to design an optimal mix of resources for students throughout their studies. Since students are the users of these resources, it is vital to include their perspectives and experiences as well. Additionally, national strategies, policies, and guidelines on how to collaboratively develop and disseminate resources, and how to execute quality assurance processes should be provided to support institutes in opening up their curriculum.

OER as an element of open pedagogy to stimulate meaningful learning

Notwithstanding the efforts to make educational and scientific content more accessible, we must not forget to extent our focus on the value and opportunities of open resources for students' learning as well. Nowadays, students are not only learning when gaining a qualification at an institute, but learning takes place

seamlessly throughout their life by engaging in open and collaborative networks and communities, and utilizing openly available resources (Hegarty, 2015). Open pedagogy can contribute to prepare students to master the skills they need for their future role in a knowledge-based society. Open pedagogy transcends the focus of OER adoption, but 'embraces a dynamic discourse from a larger scope that leads to a combination of 'open-oriented' practices, remixing open resources, open teaching and pedagogy, empowerment of students, as well as networked participatory scholarship' (Luo et al., 2020, p. 151). Students are not solely recipients of knowledge, but fulfil an active and participatory role as co-creators of knowledge. For example, students can be invited to create tutorials on certain topics that can be shared publicly, they can be encouraged to reuse and remix resources into new products, or teachers can delimit the use of disposable assignments that take students hours to create, but are never looked at by others except the teacher grading it (Wiley & Hilton, 2018). Hence, creating value for society is a core principle of open pedagogy. To stipulate how open pedagogy can enhance meaningful learning for students, Post et al. (2022) created the conceptual Open Pedagogy Framework 2.0 which illustrates the characteristic learning activities that revolve around working in open networks and with OER. It highlights the participatory role of students to appraise, create, and share information which can act as a catalyst for meaningful learning. Subsequently, we expect that this shift to open pedagogy, where the conversation is focused on the value of openness for teaching, learning, and society, can help institutes to further sustain OER and openness in higher education.

CONCLUDING REMARKS

This dissertation has contributed to available literature and practices on OER adoption. More specifically, it provided insights into teachers' needs of support and their perspective on OER quality. The findings illustrate the potential of OER for higher education, but teachers' perspectives of OER quality remains an ongoing concern. Inter-institutional communities could diminish these concerns because resources are shared with peers within a specific domain. The role of the broker to cultivate the community is essential, but they should be sufficiently supported and empowered. Moreover, teachers must feel that the community provides them with value to foster its sustainability. A focus on value creation within such communities, both individual and public values, combined with quality assurances processes for OER, could be a way to promote and increase sustainable OER adoption, thereby contributing to enhance openness in higher education and bringing OER adoption beyond the question 'what's in it for me'.

