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

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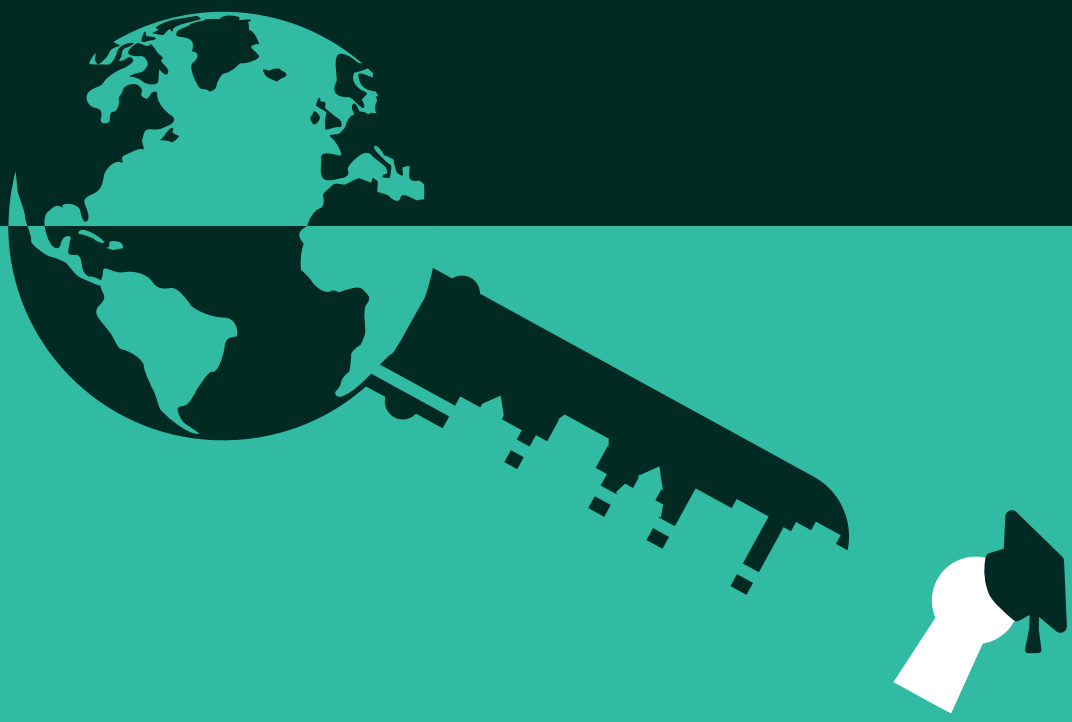
# OPEN TO ALL, NOT KNOWN TO ALL

## SUSTAINING PRACTICES WITH OPEN EDUCATIONAL RESOURCES IN HIGHER EDUCATION



# Open to all, not known to all

## Sustaining practices with open educational resources in higher education

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# 1

# Introduction

## ORIGINS OF THE STUDY

Higher education curricula are regularly transformed to stay abreast of the changing world. Teachers continuously design, update or revise their curricula to prepare students for this rapidly changing world (Visscher-Voerman, 2018), as well as to meet students' changing needs regarding learning resources (Bolhuis et al., 2020). To aid students' learning, teachers use a wide range of resources. Nowadays, many educational resources are available online with open licenses that indicate how they may be reused. These resources are shared by people around the globe and are better known as open educational resources (OER). OER are 'learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others' (UNESCO, 2020, p. 5). The concept of OER can contribute to the Sustainable Development Goals, especially in relation to goal number 4 (UNESCO, 2020), which aspires to ensure inclusive and equitable quality education in which resources are available to all, learning conducive, and non-discriminatory as to promote lifelong learning opportunities (United Nations, 2015).

Indeed, one primary advantage of OER for students relate to having free access to resources. OER are open to all, meaning that students do not have to pay for them. This is pivotal to expand access to higher education, especially in the Global South, where fees for resources are a pressing issue (Hodgkinson-Williams & Arinto, 2017; Kanwar et al., 2010). Also in the Netherlands, it could contribute to minimizing financial stress because many students take out bigger loans to finance their studies (CBS, 2022). Similar developments are visible in North America where students pay an average of 1126 dollars for textbooks annually (Hanson, 2022), and simply not all students can afford buying course materials (Martin et al., 2017; Wittkower & Lo, 2019). As a response, zero-cost degrees are a prevalent development which enables students to enter a degree programme that exclusively use resources that are available at no costs. These zero-cost degrees make education more equitable without detrimental effects on learning performance (Clinton & Khan, 2019; Fischer et al., 2015; Hilton, 2020). Another advantage is that OER can increase the variety of the resources students use to support their learning process. Different pedagogies, different modalities, or just seeing other examples are reasons why students often look for additional resources in addition to the recommended course resources (Schuwer et al., 2021). Nonetheless, to realize inclusive and equitable quality higher education, it is necessary to focus on teachers because they design, revise, or teach the courses (Fullan, 2015).

A key advantage of OER for teachers is they can reuse OER rather than start from scratch when designing or revising curricula (Armellini & Nie, 2013; Hylén, 2006). It allows teachers to customize resources as to align them with their specific context and needs (Belikov & Bodily, 2016). For example, a teacher can decide to use only parts of a resource (e.g. only use one chapter of a textbook), may decide to revise a resource to better illustrate their specific context (e.g. to add content or include diversity), or mix OERs with other resources to enhance the course content

for students (e.g. to provide differentiation). This increased access to a wide variety of resources can improve teachers' critical reflection on their own practices as they are exposed to other perspectives and approaches (Rolfe, 2017; Weller et al., 2015). Moreover, it enables teachers to more easily vary in their pedagogical and didactical approach (Clinton-Lisell, 2021). Consequently, OER can contribute to the current developments in higher education in which curricula are often revised to blended learning (Bos, 2022), as well as to emergency remote teaching like in school closures during the covid-19 pandemic (Zaalouk et al., 2021).

Yet, despite the opportunities OER can have to contribute to high quality and accessible education, reuse appears to remain low in higher education (e.g. Baas & Schuwer, 2020; Hodgkinson-Williams & Arinto, 2017). It appears OER are not yet fully exploited due to many challenges that teachers encounter. These challenges can be related to the five phases of the OER reuse process (Clements & Pawlowski, 2012): search, evaluate, adapt, use, and share. Teachers need skills to *search* for relevant OER. However, due to the large number of OER, distributed within numerous repositories, discoverability of OER is a main issue (Barker & Campbell, 2016). This is strengthened due to a lack of awareness of the concept of OER and how they differ from traditional resources (e.g. Marín et al., 2022; Schuwer & Janssen, 2018). For example, traditional resources like textbooks or interactive online environments are often restricted by copyright or require licenses, whereas OER permits free use and re-purposing. When teachers find OER, they need to *evaluate* them on relevance for their teaching practice. Yet, despite the large number of resources available, teachers struggle to find resources that are relevant, up-to-date, and of good quality (Admiraal, 2022). To overcome this challenge, several quality assurance mechanisms are available for teachers, but none have been widely accepted and used (Zawacki-Richter & Mayrberger, 2017). When a resource is deemed relevant, teachers may *adapt* the resource. Since OERs are offered across a wide range of granularity, they are often not as structured or as complete as commercial materials (Chae & Jenkins, 2015). Teachers need to determine whether the resources fit, or can be changed to fit, to their specific context and objectives (Armellini & Nie, 2013; Sloep, 2014). If a teacher is content with an OER, they may *use* it in a wide range of ways. For example, they can use the resource within their class, within the virtual learning environment, or with another resource. However, related to teachers' limited awareness of OER, teachers are unsure about intellectual property rights and open licences, which negatively impacts uptake (Schuwer & Janssen, 2018). It can be concluded that teachers need specific skills and knowledge to fully exploit the benefits of OER (Grégoire & Dieng, 2016).

Though, reuse of OER cannot happen without resources that are *shared* by institutes and teachers. Motivations to share, both from the perspective of an institute or a teacher, are abundant (Hylén, 2006): resources can be shared from an altruistic viewpoint (i.e. it is a good thing to do); from a moral viewpoint, because institutes are publicly funded (i.e. return of taxpayers' money); from a quality viewpoint, because resources are improved through peer feedback (i.e. what you

give, you receive back improved); from a marketing viewpoint, because sharing resources can lead to more exposure (i.e. attract new students); and from a financial viewpoint as it can offer opportunities to new business models (i.e. additional ways of creating revenue). Numerous initiatives to share have been initiated across the globe, but many tamp out after the project funding ends (Orr et al., 2015). Sustainable practices with OER are still constrained and it is therefore crucial we increase our understanding of how we can move from a few single teachers' enthusiasm to a sustainable practice in which resources are continuously shared, reused, and updated. Nevertheless, limited empirical research has been undertaken to investigate how structural adoption of OER in higher education can be enhanced. Hence, this dissertation aims to examine the challenges of OER adoption in higher education so that we can contribute insights into the sustainability issues many OER initiatives encounter. Before we go into detail about these sustainability issues, we will first elaborate on the concepts of open education and open educational resources.

## OPENING-UP HIGHER EDUCATION

The concept of OER is part of the wider open movement that aims to move from knowledge as a commodity to knowledge as a commons. This movement has gained considerable traction within different domains. For example, most likely every scientist is familiar with concepts like open access, open data, and open science, and every programmer is probably versed in open source software. Concepts like open educational resources, massive open online courses, and open educational practices can all be understood as open education.

A long history let to the prevalence of open education (Cronin, 2018; Weller et al., 2018), but it accelerated due to technological advancements and copyright management that have been indispensable to realize the promise of open education, namely to improve access, effectiveness, and equality in education (Lane, 2016). Open education is not intended to be a substitute for traditional higher education, but it aims to provide learners free access to resources throughout their lifelong learning (Blessinger & Bliss, 2016). Thus, the main objective of open education is to make learning opportunities accessible and customisable for all as it provides multiple ways of teaching, learning, building, and sharing knowledge (Inamorato dos Santos et al., 2016). Open education, however, is a rather conceptual movement, which resulted in several supporting frameworks. For example, The Guidelines on the Development of OER Policies (Miao et al., 2019) and the Open Education Policies: Guidelines for co-creation (Atenas et al., 2020) can be used to design and implement a policy as a driving force for OER adoption. The OpenEd Quality Framework (Stracke, 2019) can be used to design, realize, and evaluate open education on the macro, meso and micro level. To support institutes with a holistic strategy for opening up education, the OpenEdu framework has been created by the European Commission which presents 10 interrelated dimensions of open education (Inamorato dos Santos et al., 2016): six core dimensions that illustrate the 'what' of opening up education (access, content,

pedagogy, recognition, collaboration, and research), and four transversal dimensions (strategy, technology, leadership, quality) illustrate the 'how' of opening up education.

It is beyond the scope of this dissertation to further conceptualize open education, especially because it is an evolving definition with continuous new branches of focus areas (Weller et al., 2018). But to simplify the concept, we want to accentuate between four broad interpretations of openness in higher education (Cronin, 2017):

- *Open admission* is known as 'the classical' definition of openness with open admission or open entry to formal education. This means that anyone can enrol into courses of a higher education institute (e.g. open universities) although course fees might still apply.
- *Open as free* relates to openness as having access to resources with no cost to the user. A wide range of resources are available to users under this interpretation of openness as users can search online for resources and courses that they can access without costs. A well-known example of open as free are massive open online courses (MOOC). MOOCs are online courses offered by educational and commercial institutes, and can be subscribed to without any cost. It is important to note that, unless specified, resources in the course can still be copyright restricted. MOOCs are mainly shared to realize online learning at scale, whereas OERs are mainly shared to build access to educational content (Schophuizen et al., 2021).
- *Open educational resources* refer to a third interpretation of openness, which indicates that access as well as personalisation and adjustments of resources are allowed so that users can optimize the resources for their own objectives and audiences. Users may reuse, retain, revise, remix, and redistribute these resources.
- *Open educational practices* (OEP) can be seen as 'the second phase' of OER to further improve the quality of students' learning experiences in higher education (Ehlers, 2011). Although conceptualisations of OEP vary widely (Cronin & MacLaren, 2018), OEP can be described as 'collaborative practices that include the creation, use, and reuse of OER, as well as pedagogical practices employing participatory technologies and social networks for interaction, peer-learning, knowledge creation, and empowerment of learners (Cronin, 2017, p. 4).

The worldwide movement to increase openness in higher education is also visible within the Dutch higher education context. In 2015, the Dutch Ministry of Education, Culture, and Science (OCW, 2015) published its Strategic Agenda for Higher Education in which the ambition was formulated that in 2025 all resources in higher education are available as OER. This way, teachers will have access to a wide range of resources to innovate their teaching and enhance students' learning.

## DEFINING OPEN EDUCATIONAL RESOURCES

The origin of the concept of OER can be led back to 2001 when Massachusetts Institute of Technology began to share the materials of their courses online as OpenCourseWare, and many institutes followed this movement. In 2002, the term open educational resources was officially adopted to describe open content that can be used within educational settings (Butcher et al., 2011). This term discerned itself from prior terms like learning objects and reusable learning objects because of the licenses that are used to indicate the users' permissions and restrictions. Surely, the difference between a traditional resource and an open educational resource are the OER's defining '5R characteristics': users may reuse, retain, revise, remix, and redistribute the resource. Everyone has the permission to engage in the following '5R' activities (Wiley, 2014):

- Reuse: the content can be reused in its unaltered original format and may be used in a wide range of ways. For example, a teacher may use the resource in their class, in the virtual learning environment, in a video, online, or anywhere else.
- Retain: the content can be retained for personal archives or references. For example, a teacher has the right to download, store, manage, and own copies of the resource.
- Revise: the content may be modified, adapted, adjusted, or altered to align it with the user's specific needs. For example, a teacher may translate the content into another language, only use parts of the resource, or adapt it to their specific context.
- Remix: the content, either the original content or revised content, may be adapted with other content to create something new. For example, a teacher combines their own resources with an OER to create a new resource.
- Redistribute: the content, either in its original format or altered format, may be shared with anyone else. For example, a teacher can freely share copies of the resource with colleagues and students.

These characteristics, however, do not imply that copyright is non-existent. Only resources that are given to the public domain cease to have copyright and may therefore be used freely. Many OER are protected by copyright since the creator still owns the rights, but chooses to use an open license to denote the conditions of the grant of these '5R' permissions. Several types of open licenses exist, but the most popular provider is the Creative Commons (CC). In this case, the creator of the resource can define what is allowed with a combination of permissions and restrictions. Openness of a resource can vary between a user only has to mention the creator of the resources (CC BY), but is otherwise free to retain, revise, reuse, remix, and redistribute the resource, to a license that states it is not allowed to use it commercially (CC NC), to make derivates (CC ND), to redistribute the resource with another license (CC SA), or any combination thereof (e.g. CC BY-NC-SA).

Nowadays, over two billion resources are available online that are shared with a Creative Commons license (Creative Commons, n.d.). Teachers can, for example, search with filters for OER within well-known repositories like YouTube,

Flickr, or Vimeo, but they can also search within OER specific repositories like MERLOT, OASIS, OERCommons or in the Dutch repositories Wikiwijs and edusources. As a result, there is a vast number of OER available for teachers comprising a wide range of types of resources. Generally, OER can be divided in two categories: 'big' and 'little' OERs (Weller, 2010). Big OERs are created by institutes, are often of high quality and are designed with explicit teaching aims. Examples hereof are Open Textbooks, OpenCourseWare, and Open Online Courses. Little OERs are individually created, may not have explicit educational aims, and are made at lower costs, often resulting in low production quality. Little OER can consist of all kinds of smaller resources such as presentations, assignments, assessments, pictures or videos. It is important to note that although this granularity of an OER might indicate a certain level of quality, it does not imply that big OERs are better than little OERs. It depends on a teacher's needs: they select their resources based upon their own professional context, their instructional frameworks, and in relation to the needs of their students (Hood, 2018). Thus, teachers are curators by 'selecting and structuring resources for educational purposes, while providing context and a coherent presentation for a particular audience' (Leighton & Griffioen, p. 3).

To accelerate the promotion of OER, several iterations of declarations were written. In 2007, the Cape Town Open Education Declaration was shared in which three strategies were formulated to accelerate efforts to: (i) further the creation, use, and expansion of OERs, (ii) stimulate the sharing of resources with open licenses, and (iii) change institutional policies to include and support open education. In 2012, the Paris OER declaration continued these efforts on OER, but also emphasized and stressed the need of a cultural change within governments to openly license resources that are developed with public funds. In 2019, UNESCO recognizes its leading role to achieve Sustainable Development Goal 4 and to continue building upon the previous declarations. This led to the Recommendation on OER (UNESCO, 2020) in which UNESCO recommends a shift to the use of OER to innovate pedagogical practices, and to advocate for regional and global collaboration to create more sustainable initiatives. Indeed, despite its potential, actual use in curricula appears to remain low which is partly inflicted due to issues with sustaining OER initiatives. Most initiatives tamp out after the project funding ends, resulting in almost half of the 70 OER repositories that were started since 2002 no longer exist or are not maintained (Wang et al., 2017). Consequently, sustainability of OER initiatives is a concern that should require our attention.

## BOOSTING THE SUSTAINABILITY OF OER INITIATIVES

Since project funding alone is not sufficient to sustain OER initiatives, sustainability of OER has been a topic of interest over the past two decades. Already in 2007, Downes specified four elements of sustainability: (i) the funding of the initiative, (ii) the technical sustainability of OER related to the development and distribution of quality OER, (iii) the content and the type of OER that impacts its lifespan, and (iv)

the selection and hiring of staff that is needed to cultivate and sustain the initiative. More recently, Tlili et al. (2020), described the variety of sustainability models that can be employed to promote sustainable OER initiatives. The authors outline ten OER sustainability models, including models focused on receiving funding (e.g. internal or public funding), models that focus at generating funding (e.g. producing OER on demand), and models that focus on communities (e.g. participation in an OER network). Although these models are clearly distinguishable on paper, it is stressed by Tlili et al. (2020) that institutes often implement a combination of models. In fact, the aspect of community building is paramount for all OER initiatives (De Langen, 2018). To further the sustainability of OER initiatives, UNESCO included the 'nurturing creation of sustainability models for OER' as one of the five Areas of Action in the Recommendation on OER (2020). It states that it is necessary to 'promoting and raising awareness of other value-added models using OER across institutions and countries where the focus is on participation, co-creation, generating value collectively, community partnerships, spurring innovation, and bringing people together for a commons cause' (par. iv, point c). We are especially interested in the community-based model in which the focus is on partnerships between institutions because this can lead to transformational change through which collaborative learning practices can evolve and social inequalities can diminish (cf. Laufer et al., 2021).

The Dutch government launched a grant scheme (2015-2022) to foster OER adoption in higher education. As of 2018, an emphasis has been placed upon the formation of inter-institutional professional communities on OER, because 'through open sharing of digital learning resources in professional communities, teachers can reuse (parts of) each other's resources, as well as giving each other feedback and thus improving the resources' (OCW, 2019, p. 68). However, it requires an active community of both users and contributors so that resources are shared, reused, and kept up to date (Orr et al., 2015). Yet, initiatives often originate from a small community of enthusiastic teachers who 'face the challenge of keeping up the initial momentum and ensuring the maintenance of a certain level of quality, while also reaching out to a broader audience.' (Orr et al., 2015, p. 33). In the next sections we will discuss these two issues of a central control of quality and cultivating the community in more detail.

### Organizing a central control of OER quality

As previously discussed, a main barrier to OER adoption is that teachers struggle to find resources that are relevant, up-to-date, and of good quality (Admiraal, 2022). This directly affects adoption: if teachers feel that they have to invest too much time to face the daunting task of searching for OER while not having a good return on investment, they might stop looking for OER altogether. This issue could be strengthened because OER are free to use: teachers' perceptions of OER might be hesitant due to the related consumer belief that if something is free, it is of inferior quality compared to something that costs money (Ariely et al., 2006; Abramovich

& McBride, 2018). To reduce this perceived endeavour of searching and evaluating OER, several support mechanisms are implemented to assist teachers.

Librarians, for example, are experts in information retrieval and open licenses and can provide teachers with answers and support (Katz, 2020; Reed & Jahre, 2019). Librarians can act as advocates within the institute and curate overviews of possible relevant resources within a given subject, although this requires a large investment while not always effective (Davis et al., 2016). Thus, librarians as well as teachers who want to search for OER, can also be supported in the search and evaluation phases through the design features of repositories (Atenas & Havemann, 2014; Clements et al., 2015). Repositories can, for example, guide teachers to effectively assess resources through evaluative metadata (Abramovich & Schunn, 2012), peer reviews and user comments (Cechinel & Sánchez-Alonso, 2011; Clements & Pawlowski, 2012; Kelty et al., 2008), automated analysis (Başaran, 2016; Cechinel et al., 2011), usage data (Kurilovas et al., 2011) or through emerging technologies such as artificial intelligence, internet of things and blockchain (Tlili et al., 2021).

Yet, the relevance and quality of a resource is still best assessed by the teachers themselves as they are the pedagogical and content experts (Gros & López, 2016; King, 2017). Numerous rubrics are provided to help teachers judge the quality of resources. Initially rubrics were directed at evaluating learning objects, for example the *Learning Object Review Instrument* by Leacock and Nesbit (2007) or the *Learning Object Evaluation Metric* by Kay and Knaack (2008). Currently, however, there are also specific rubrics available for OER. The *TIPS Quality Assurance Framework* (Kawachi, 2013), for example, guides designers towards publishing high-quality OER, while the *Framework for selecting OER on the basis of fitness for purpose* (Jung et al., 2016) supports teachers in reusing OER. Even though there are many rubrics available that could offer teachers some guidance, these have often not been empirically tested (Yuan & Recker, 2015; Zawacki-Richter & Mayrberger, 2017).

In addition to the more informal and personal decision of OER quality, institutes can also create their own guidelines for OER quality assurance mechanisms (Marín et al., 2022). This could overcome the issue that most repositories do not have sufficient retrieval features aligned with teachers' educational needs (Santos-Hermosa et al., 2017). Nonetheless, it still requires an active community of both users and contributors so that resources are shared, reused, and kept up to date (Orr et al., 2015).

### Cultivating an OER community

Communities do not evolve by themselves, efforts must be undertaken to cultivate communities (e.g. Booth, 2012; Macía & García, 2016; Wenger et al., 2002). Yet, increasing the small group of volunteers into a broader community of users and contributors is an arduous task, because it requires constant collaboration across institutes to create an active community. Especially in inter-institutional community where there might be sociocultural differences that must be overcome (Akkerman

& Bakker, 2011). To connect several local groups into one community (e.g. teachers across institutes), boundary spanners are essential to the formation and maintenance of inter-institutional relationships (Van Meerkerk & Edelenbos, 2018). Depending on the situational demands and their capacities, their tasks can be combined in a profile of fixer, bridger, broker, or innovative entrepreneur (Van Meerkerk & Edelenbos, 2018). Within inter-institutional communities on OER, we are interested in the profile of broker, who are individuals who facilitate transfer of knowledge and resources, and coordinate efforts across boundaries of organization (Long et al., 2013). Brokers act as a bridge between sites, such as across higher education institutes (Akkerman & Bakker, 2011).

To date, most research have explored boundary spanning roles in university-industry collaboration (Corsi et al., 2021; Martin & Ibbotson, 2021; Oonk et al., 2020), within transnational partnerships (Bordogna, 2019) and university-school partnerships (Akkerman & Bruining, 2016; Nguyen, 2020). Yet little empirical research has been undertaken on the role of boundary spanners within inter-institutional collaborations (Hill, 2020). Brokers take up the role to cultivate the community, but in conjunction with their efforts, teachers must also feel that it provides them with value. Otherwise, teachers' engagement will decrease and the community will cease to exist (Wenger et al., 2002). Hence, it is pivotal teachers feel that their engagement generates value, because participation costs time, and 'most community members experience both internal and external pressure to discover and deliver value soon after the community starts' (Wenger, 2002, p. 84).

Within the domain of OER, research on value creation within communities is scarce, whilst this information can inform inter-institutional communities to further develop and cultivate the community by initiating or designing supporting activities and practices (Wenger et al., 2011). Prior studies have mainly explored the processes of initiating and realizing communities (e.g. Borthwick & Dickens, 2013; Burgos-Aguilar & Mortera-Gutierrez, 2013; Smith & Lee, 2017; Tosato & Bodi, 2011; Tosato et al., 2014), but to better understand sustainability issues, additional insights are needed into the question that teachers might ask themselves: what's in it for me?

## RESEARCH AIMS

In this dissertation, we aimed to improve our understanding about teachers' adoption of OER within higher education to contribute valuable insights into sustainability issues OER initiatives encounter. Four studies were designed to gain insights into (1) teachers' current practices with OER and their need for support, (2) teachers' assessments of OERs on quality, (3) the role of brokers in cultivating an inter-institutional community on OER, and (4) teachers' perceived value of that community.

The first two studies focus on teachers within the context of a university of applied sciences in the Netherlands. This institute has no policies, incentives or services on the use or creation of OER, but it ratifies the national ambitions. The first study was

designed to explore teachers' current practices as to gain an understanding of the extent of OER adoption, as well as to investigate teachers' needs for support. Although the OER adoption pyramid provides insights into the prerequisites of teachers' volition to adopt OER (Cox & Trotter, 2017), more understanding is needed on the kind of support teachers would prefer. Thus, we set up the following study:

1. An exploratory mixed-methods study to examine teachers' current practices with OER and their need for support to foster OER adoption.

The second study intended to gain more, much needed, empirical insights on teachers' assessment and selection of resources (Belikov & McLure, 2020; Leighton & Griffioen, 2021). Previous studies have tended to focus on quantitative measures of OER quality compared to that of traditional resources as defined by teachers' perceptions (Abramovich & McBride, 2018; Clements & Pawlowski, 2012; Kimmons, 2015), the ones from reviewers (Fischer et al., 2017), and students' perceptions (Cuttler, 2019; Howard & Whitemore, 2020; Morales & Baker, 2018; Nipa & Kermanshachi, 2020; Oelfke et al., 2021), but insufficient attention has been paid to the qualitative process of teachers' evaluations of OER. Therefore, the following study was designed:

2. A descriptive qualitative study to analyse teachers' collaborative assessment of OER quality, and to investigate whether changes has occurred in teachers' perceptions of OER.

The final two studies were conducted within the context of an inter-institutional communities on OER. This specific community, called Together Nursing, received funding from the previously mentioned grant scheme of the Dutch government to initiate and strengthen a collaboration between all 15 universities of applied sciences in the Netherlands that offer the Bachelor Nursing. Two interconnected platforms were used to promote engagement and interaction: teachers could search and share resources in a repository, and they could connect with colleagues and discuss practices within an online community. This specific inter-institutional community around OER was chosen because (i) this community already had the prerequisites in place since they explored the feasibility of this collaboration in a prior project, (ii) the institutes had collaboratively designed a new curriculum, and (iii) new topics in this curriculum compelled institutes to develop new resources. We explored the role of brokers in cultivating the inter- institutional community on OER, whilst we also examined teachers' perceived value of this collaboration. We believe that both aspects are pivotal to further our insights into realizing sustainable OER communities. Consequently, this resulted in the formulation of the last two studies:

3. A descriptive qualitative study to describe the role of brokers in cultivating an inter-institutional community around OER.

4. A convergent mixed-methods study to illustrate the value that teachers perceive through their engagement with this inter-institutional community.

With these four studies, we aim to contribute to theoretical insights into the topic of OER adoption in higher education. The findings will be beneficial for the Dutch context, in particular, because the government's ambitions and its related grant scheme paved the way to collaborate on a national level on the sharing and reuse of resources. A national approach to digital and open educational resources has been formulated (De Jong & Van den Berg, 2022) in which Dutch higher education institutes have agreed to work together to create, share, reuse, and purchase educational resources. These national ambitions are currently further strengthened and taken up within the broader Digital Transformation Impulse of Education. This new initiative, funded by the Dutch government, is an eight-year programme (2022-2030) in which vocational education and training, research universities, and universities of applied sciences will join forces to enhance the quality of education, increase the flexibility of education, and promote the digital skills of teachers and learners (Digitaliseringsimpuls, n.d.).

Consequently, through bridging the gap between the current practices of OER in higher education and limited empirical insights from research, we hope to provide practical and theoretical recommendations on teachers' evaluation and reuse of OER as well as for creating sustainable OER communities to further our efforts to opening up higher education.

## OUTLINE OF THIS DISSERTATION

This dissertation contains six chapters. The next four chapters include the studies as described in the previous paragraph. In the final chapter we summarize and discuss the findings of all four studies. Together, it contributes to the research aim to improve our understanding about teachers' adoption of OER in higher education. See Figure 1.1 for an overview of this dissertation.

In **Chapter 2**, we present an exploratory research study that focuses on gaining insights on teachers' current practices with OER and their need for support. The research questions that guided this study are: (1) To what extent are teachers aware of OER and how do they perceive their capacity and the availability of OER? (2) What is the current state of affairs regarding teachers' volition and adoption of OER? To answer these research questions, we applied a mixed-method design in which results of a questionnaire (n=143) were combined with semi-structured interviews (n=11). Quantitative data were analysed with descriptive statistics and a combination of inductive and deductive coding was applied to the interview data.

In **Chapter 3**, we present a study with the focus on teachers' assessments of OER on quality. To better understand how teachers assess OER, three small groups of teachers were asked to collaboratively assess a provided selection of 'big' OER. The following research questions are addressed: (1) What elements do higher education teachers take into account when assessing the quality of 'big' OER? (2)

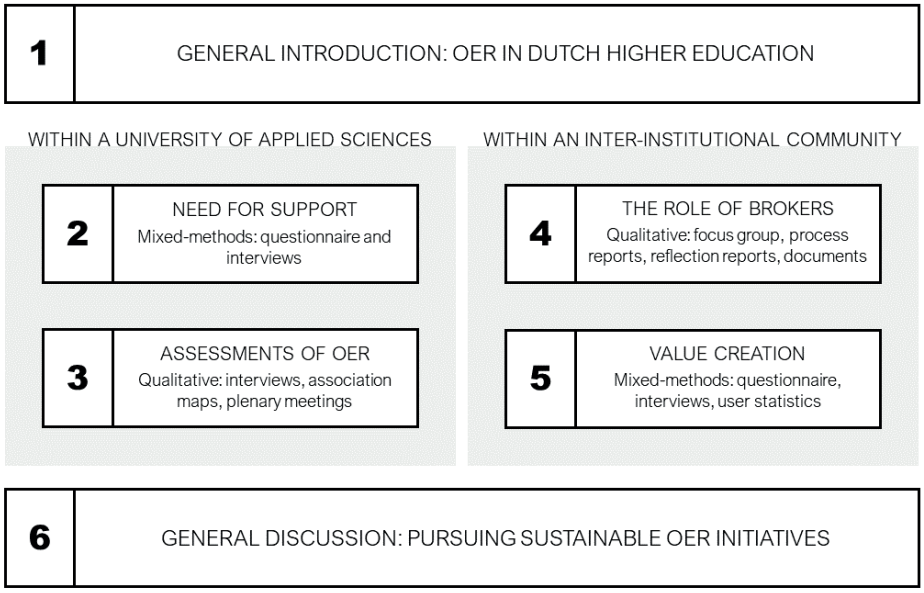
If and how did teachers' perception of OER change due to their interaction on the provided OER? In this descriptive qualitative study, 11 teachers participated who were clustered into three groups, depending on the subject they taught. The entire research procedure was approximately 4 months. Within this period, they participated in a plenary meeting to discuss OERs, and they were interviewed twice: both at the beginning and at the end of the teaching trimester. In these individual interviews, teachers were asked to create an association map on OER after which additional questions were asked. We inductively analysed teachers' conversations within the plenary meetings with the 'two-column method' based on Argyris and Schön (1974). We also created teacher descriptions on the basis of the data collected. Each description consisted of the changes in their maps, highlights of the remarks in the plenary meeting, and a summary of the second interview.

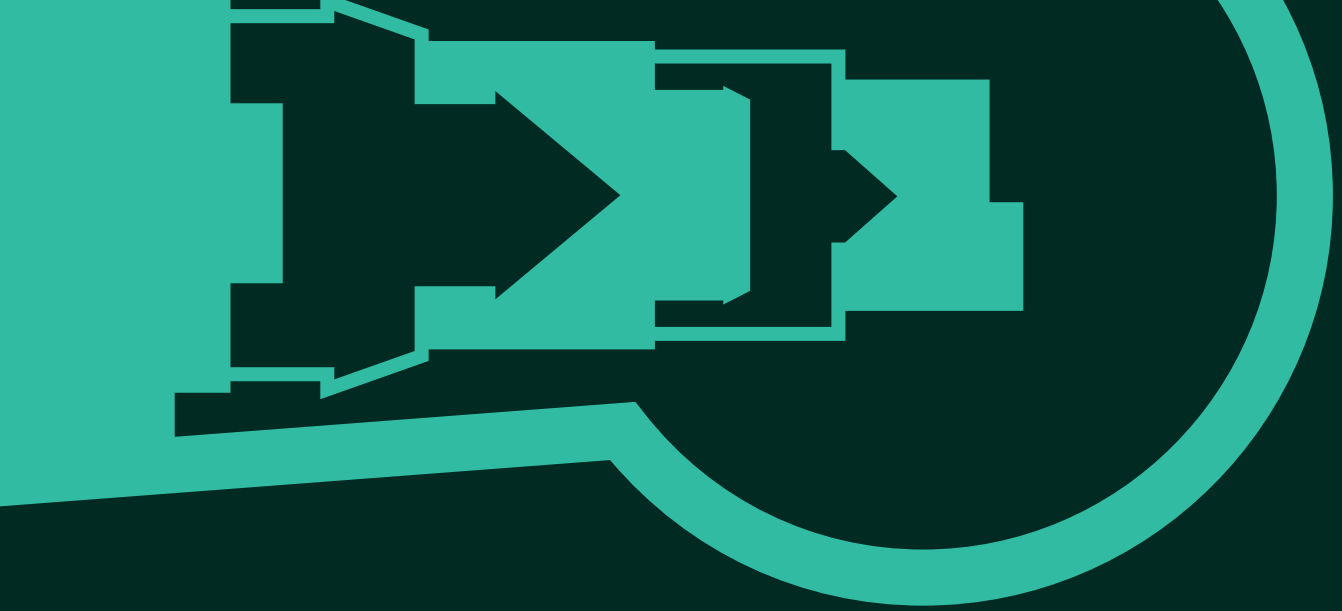
The last two studies took place within an inter-institutional community around OER in which 15 higher education institutes collaborate on sharing knowledge and resources within the domain of nursing education. In Chapter 4, we describe the findings of our qualitative study in which we explore the role of brokers to cultivate the inter-institutional community. These brokers applied boundary spanning behaviour with the aim to increase the size of the user group and to create conditions to sustain this collaboration. This study draws upon Cultural-Historical Activity Theory to understand the complexities associated with the role of brokers. The research questions that guided our study are: (1) How do the brokers reflect upon their actions that they deployed to cultivate the inter-institutional community on OER to realize changes in teachers' practices? (2) Which perceived outcomes and contradictions do brokers see about their role to foster sustainable collaboration on OER among higher education teachers across institutes? Qualitative data were collected which included project documents, process reports, reflection reports, and an online focus group. We used cultural-historical activity theory as a conceptual framework to analyse the past, present, and future of this specific activity system (Engeström, 1987). Thus, the data were analysed with codes based on the elements of the general model of an activity system.

Subsequently, since teachers are the main users of this inter-institutional community on OER, we examine the value teachers perceived from their engagement with the community in Chapter 5. We explore this through the research question: (1) What kind of value do teachers perceive through their engagement with the inter-institutional community? Data for this mixed-method study was collected by downloading user statistics, via a questionnaire (n=116), and through semi-structured interviews (n=4). Descriptive analyses were carried out on the user statistics data and the answers on the pre-structured questions of the questionnaire. Data from the open-ended questions in the questionnaire and the interviews were analysed with a coding scheme we developed based on the conceptual framework on value creation of Wenger et al. (2011).

Lastly, in Chapter 6, we provide a summary and general discussion on the findings of the studies reported in the previous chapters after which we conclude with several theoretical and practical implications that derive of the findings of this dissertation.

Figure 1.1
*Overview of this dissertation*





# Teachers' adoption of open educational resources in higher education

This chapter is based on:
Baas, M., Admiraal, W., & Van den Berg, E. (2019). Teachers' adoption of open educational resources in higher education. *Journal of Interactive Media in Education, (1)9*, 1-11. https://doi.org/10.5334/jime.510

**ABSTRACT.** Open Educational Resources (OER) have the potential to change the domain of higher education; however, adoption is still limited. As teachers are the pivotal actors to adopt OER, more insights are needed on their practices with OER and need of support. This exploratory study uses the OER Adoption Pyramid as a framework to analyse adoption of OER within a Dutch University of Applied Sciences. A questionnaire (n=143) and semi-structured interviews with teachers who had some experience with sharing or using OER (n=11) offered insights into the current state of affairs on adoption and need of support. The results revealed that informal sharing of resources within teachers' personal networks happens frequently whereas the use of OER is more limited. If teachers use OER, they are mainly used 'as-is' or for a source of inspiration. Our findings indicate that the OER Adoption Pyramid does not properly describe the sequence of each layer within the context of this study. Availability must be lower in the pyramid as a prerequisite for teachers to explore their capacity and volition. Hence, the findings underline the need of support on subject-specific overviews of OER and the creation of national or institutional teacher communities. To improve our understanding, future research should focus on qualitative studies focusing on one case in which teachers engage with OER. This could lead to extensive insights on the factors and sequence of the OER Adoption Pyramid within different contexts.

## INTRODUCTION

Open Educational Resources (OER) are teaching, learning and research materials that use open licensing to permit users to use them for educational purposes (Orr et al., 2015). Users may retain, reuse, revise, remix and redistribute the resources, also known as the '5R' characteristics (Wiley, n.d.). These characteristics offer teachers pedagogical benefits to adapt the resources to their specific teaching needs (Belikov & Bodily, 2016). As OER are shared across the world, they offer teachers access to more and different pedagogical practices, which, in turn, can result in enhanced teaching practices (Rolfe, 2017). Other benefits refer to increased collaboration between fellow teachers across institutes (Chae & Jenkins, 2015), growth in critical reflection of teachers on their practices (Weller et al., 2015) and improved access to educational materials (Hennessy et al., 2015; Hilton et al., 2014).

OER could therefore have the potential to change teaching in higher education by providing access to a diverse collection of resources, information and practices. Teachers could make use of this diverse collection in four types of practices (Armellini & Nie, 2013): (1) 'as-is' as a planned enhancement during curriculum design, (2) 'as-is' as a 'just-in-time' resource during course delivery, (3) adapted OER during curriculum design, and (4) adapted OER during course delivery. Nevertheless, despite the growing number of open resources accessible, the use of OER in higher education is low (Allen & Seaman, 2014; Schuwer & Janssen, 2016). However, this does not imply that reuse is not happening, as it might take place 'below the radar' (Glennie et al., 2012). A recent study by Beaven (2018) showed that most practices are hidden and that adoption most often takes place in what Wiley (2009) has called 'dark reuse'. Teachers either find resources somewhere online, receive resources from their colleagues or already have resources in their personal collections. Consequently, it might appear that adoption does not take place, even though teachers might engage in OER practices more than they are aware of. Hence, it is essential to gain more insights into teachers' practices to examine the current state of affairs on adoption as well as to explore their need of support that could foster adoption.

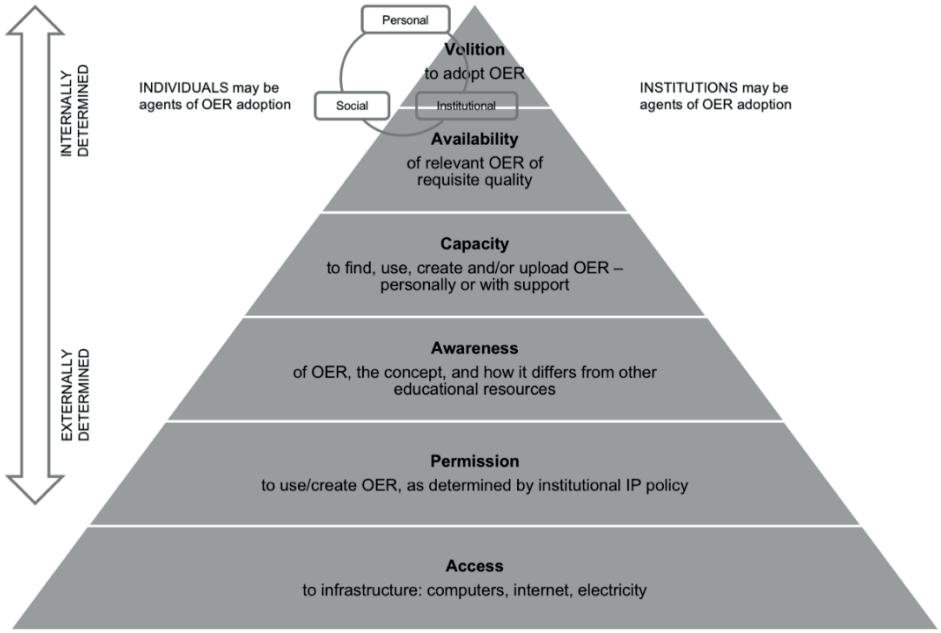
### Adoption of OER

Previous research identified different factors that influence OER adoption. Based on this, Cox and Trotter (2017) formulated the OER Adoption Pyramid (Figure 2.1) to underline the interdependencies of these factors in relation to adoption. The pyramid shape implies that each layer must be accomplished before the next layer can be realised; the lower layers are remote factors (teachers have little control over them) whereas the upper layers are immediate factors (teachers have personal control over them).

The OER Adoption Pyramid denotes that six layers account for OER adoption: if the bottom layers are not provided for, then the upper layers will have less effect on OER engagement of teachers. First of all, teachers need access to infrastructure and hardware. A minimal level of information and communications

technology (ICT) infrastructure is an important fundamental factor (de Oliviera Neto et al., 2017). The next prerequisite is the legal permission teachers need to either share teaching materials as OER or to use OER in curricula. Previous research by Cox (2013) showed that intellectual property (IP) policies of the institution determine whether teachers are allowed openly to share resources. Licences on the resources provide information on how teachers can use OER, but these require teachers' conceptual awareness of OER and how they differ from other digital resources. Yet several studies show that teachers' awareness of OER is low (Belikov & Bodily, 2016; Ozdemir & Bonk, 2017).

Figure 2.1
*OER Adoption Pyramid (Cox & Trotter, 2017)*




If teachers are aware of OER, technical skills are needed in order to find, use, create and upload OER. Finding appropriate OER is an issue, as a lack in knowledge of IP rights and open licences negatively influences teachers' uptake (Schuwer & Janssen, 2018). In addition, as OER are often not as structured or as complete as commercial materials (Chae & Jenkins, 2015), teachers need to determine whether the resources fit, or can be changed to fit, their specific context (Sloep, 2014). Even if teachers do possess these skills, volition is reliant on the actual availability of OER. This encompasses not only the number of available OER, but also the perceived relevance and quality of OER. Finally, volition is the key factor that determines OER adoption. As can be seen in Figure 2.1, three types of volition influence OER adoption: personal, social and institutional. Personal volition is, among others, induced from teaching style and cost convenience considerations

but is also influenced by social volition (departmental and disciplinary norms) and institutional volition (support mechanisms and strategic commitments). Mtebe and Raisamo (2014) and Percy and Van Belle (2012) examined teachers' intention to adopt OER using personal as well as the social and institutional factors. Their results showed that personal volition was the main factor that influenced teachers' intention to adopt OER. Other, more qualitative studies show that social and institutional volition plays an important role as well. For example, Cox (2016) examined teachers' agency regarding OER contribution. Institutional structures were essential in facilitating teachers to spend time on OER, offering them support, and creating a culture that permits academic freedom.

Although it is known what kind of factors could account for adoption as illustrated in Figure 2.1, empirical research is needed to examine whether this model is appropriate in other contexts (Cox & Trotter, 2017). In the Netherlands, national policies on OER as well as technical possibilities to share, use and find OER evolved over the years. However, little is known about the extent of adoption and the kind of support that teachers need to foster OER adoption. As teachers are the pivotal actors to adopt OER (Allen & Seaman, 2014; Schuwer & Janssen, 2016), this study aims to gain understanding on teachers' awareness, capacity and availability of OER in relation to their current practices.

## Research questions

In 2015, the Dutch Ministry of Education published its Strategic Agenda for Higher Education (OCW, 2015). In this agenda, an ambition to increase OER adoption was announced. Institutes were explicitly called on to share and use resources from colleagues inside and outside their own institute. A national funding policy was initiated to stimulate the creation and use of OER. In 2017, a so-called four-year acceleration plan (VSNU, VH, & SURF, 2017) was presented in which a total of 40 Research Universities and Universities of Applied Sciences will collaborate to achieve substantial gains of digitalisation in higher education. The plan is divided into eight acceleration zones, one of which concentrates on open and closed digital resources. The ambition of this zone is that by 2023 teachers and students can use an optimal mix of educational materials in teaching and learning.

To be able to fulfil this ambition, it is important to know what the current state of affairs is as well as how teachers perceive the value of OER in their curriculum. As adoption is influenced by the different factors as visualised in the OER Adoption Pyramid (Cox & Trotter, 2017), this model has been applied as a conceptual framework. The foundation of the Pyramid, access and permission, is already in place in the context of this study. Hence, the following research questions have been defined:

1) To what extent are teachers aware of OER and how do they perceive their capacity and the availability of OER?
2) What is the current state of affairs regarding teachers' volition and adoption of OER?

In addition, it is important to elicit the need of support of teachers for each individual layer. This will provide insights into what kind of activities and support are needed according to teachers in order to reach the ambition in 2023. Thus, the last research question is:

3) What kind of support do teachers need to foster adoption of OER?

## METHOD

This study aimed to identify the current state of affairs and teachers' need for support to adopt OER. This exploratory study was based on teachers' self-reports. A mixed-method approach was adopted to answer the previously stated research questions. A questionnaire was sent out to examine the current state of affairs within the context of this study. Afterwards, interviews were conducted to explore teachers' current practices with OER and their need for support.

### Context

This study was conducted in a large University of Applied Sciences (UAS) in the Netherlands. The institute has no policies, incentives or services on OER but aims to increase OER adoption in curricula according to the national policy. Approximately 1,200 teachers are employed across the 13 schools of the institute and around 27,000 students are served.

### Participants and data collection

To gain an overview of the current situation of adoption, teachers were invited via a call on the intranet and in newsletters to participate in an online questionnaire in October and November 2017. A total of 143 fully completed questionnaires were returned. Table 2.1 provides the general characteristics of the participants.

Subsequently, a purposeful sample of 11 teachers was interviewed in December 2017 and January 2018. Selection of participants was based on a two-stage process. First, the 45 teachers who gave permission to be contacted for an interview in the questionnaire were grouped into school level. Second, schools that had some experience with OER were selected. Within these four selected schools, teachers, who indicated they were familiar with OER and had either used or shared resources in the previous academic year, were invited to participate. These sample criteria were used to gain more insights into teachers' motives to use OER, their perspectives and practices with OER and support that could foster OER adoption. It was reasoned that these teachers could offer insights into these key elements of this study as opposed to teachers with no experience with OER. Participation was voluntary and the purpose and nature of the study was explained before the interview. A total of 16 teachers within four different schools were invited to participate; 11 teachers responded to this invitation.

**Table 2.1**
*General characteristics of participants in questionnaire (n=143)*

| Characteristics | Categories | Total (n/%) |
|---|---|---|
| Gender | Male | 66 (46.2) |
| | Female | 76 (53.1) |
| | Other | 1 (0.7) |
| Age | <25 years | 1 (0.7) |
| | 26–35 years | 32 (22.4) |
| | 36–45 years | 42 (29.4) |
| | 46–55 years | 40 (28.0) |
| | >55 years | 28 (19.6) |
| Teaching experience | 0–2 years | 18 (12.6) |
| | 3–5 years | 39 (27.3) |
| | 6–10 years | 33 (23.1) |
| | >10 years | 53 (37.1) |

Table 2.2 provides an overview of these teachers' background; pseudonyms are used to ensure teachers' anonymity. The first author was the interviewer for all interviews, which were recorded and lasted between 35 and 60 min each, with an average duration of 43 min.

**Table 2.2**
*Background of teachers participating in interviews*

| Name | Gender | Age | Years of teaching |
|---|---|---|---|
| Chloe | Female | 53 | 7 |
| Matt | Male | 44 | 13 |
| Sebastian | Male | 46 | 3 |
| Sienna | Female | 35 | 3 |
| Ralph | Male | 65 | 26 |
| Reece | Male | 53 | 11 |
| Gary | Male | 63 | 40 |
| George | Male | 35 | 3 |
| Ethan | Male | 40 | 4 |
| Aaron | Male | 46 | 3 |
| Lily | Female | 62 | 11 |

Before commencing the study, ethical clearance was obtained from ICLON-Graduate School of Teaching of Leiden University. During data collection, several actions were undertaken to manage ethical issues. Data collected in the questionnaire were anonymous as teachers were invited indirectly, making it impossible to trace a response back to an individual. The interview data were collected after gaining consent. No demographic, institutional or personal data, which could lead to identification of teachers participating in this research study, are given.

## Measures: Questionnaire

The questionnaire was designed by selecting items of previous research that fitted each layer of the OER Adoption Pyramid. Before administering the questionnaire, all items were discussed with two OER experts, three educational technologists and all members of the research team to optimise the instrument. Forward- and back-translations were conducted to ensure validity after translation of English items. This resulted in the final version of the questionnaire (see Appendix A), which will be discussed in more detail in this section.

### *Awareness*

Two items were used in which teachers were asked to self-report their level of awareness. First, based on a question of the Open Education Research Hub (Farrow et al., 2016), a picture of a Creative Commons logo was shown and teachers could answer with 'I have never seen it', 'I have seen it but don't know what it means' and 'I have seen it and know what it means'. Second, based on a question of Allen and Seaman (2014), teachers were asked if they were familiar with OER with answer categories of 'No, I am not familiar with OER', 'I have heard of OER' and 'Yes, I am familiar with OER'. Owing to the limitations of self-reporting questions, a definition and an example of OER were given in the subsequent section to ensure all teachers had a basic understanding of OER.

### *Capacity*

Teachers' perceived capacity was measured by five items based on the self-efficacy scale to use technology of Admiraal et al. (2017). The items were adapted to fit the purpose of this study. All items used a five-point Likert scale ranging from totally disagree (1) to totally agree (5). Internal consistency of this scale (see Table 2.3) was moderate, as Cronbach's alpha had a value of 0.66.

**Table 2.3**
*Items in capacity scale*

| Scale | Items |
|---|---|
| Capacity | I have sufficient expertise to assess the quality of Open Educational Resources |
| | It is quite easy to adapt Open Educational Resources so that it meets my requirements |
| | I wonder if I have enough skills to use Open Educational Resources effectively* |
| | I have sufficient knowledge to implement Open Educational Resources in my curriculum |
| | I think I can learn to use Open Educational Resources fairly quickly |

*Note*. * Negative formulated item that has been rescored.

*Availability*

In the questionnaire, four items based on Rolfe (2012) related to the availability of OER. Two items focused on finding relevant OER (e.g. 'It is difficult to find open educational resources of sufficient quality') whereas the other two items focused on teachers' preferences about the origin of OER (e.g. 'I rather use open educational resources by an author or institution with a good reputation').

*Adoption*

To gain insights into teachers' current practices, teachers who had either heard of OER or were familiar with OER were asked if they had used OER in the previous academic year (Yes, No, I do not know) and if they had shared self-developed materials with others (Yes, No). If a teacher had shared their materials, they were asked how the materials were shared in the previous academic year. Answer options included 'without any kind of rights', 'with copyright for me', 'with copyright for the institution, 'with an open license' and 'other'. Multiple selections were possible. To gain insights into teachers' current (re)use practices, teachers were asked how often they had used certain digital learning resources in the previous academic year ranging on a scale of never (1) to often (5). In addition, teachers were asked about the origin(s) for each resource they had used, with categories publisher, self-developed, colleagues, Internet, openly licensed, company and other. Multiple selections were possible.

## Measures: Interviews

Teachers were interviewed with a semi-structured interview guide based on the recent study of Schuwer and Janssen (2018). Their interview guide was requested by the first author before the study was published. The questions in the interview guide were aimed at gaining more insights into teachers' (1) awareness of OER, (2) current behaviour, (3) volition and (4) need of support. Table 2.4 shows examples of the initial questions for each theme in the interview guide. Follow-up questions were posed based on the answers of the teachers. After the final question of the interview guide, teachers had opportunities to express any additional thoughts.

**Table 2.4**

*Examples of initial questions*

| Theme | Initial question |
|---|---|
| Awareness | How would you define Open Educational Resources? |
| Behaviour | In the questionnaire, you said you shared your own materials in the previous academic year. How did you share those materials? |
| Volition | What are your reasons to adopt materials created by others in your curriculum? |
| Support | What kind of support do you need to be able to adopt OER in your curriculum? |

## Data analyses

The data from the questionnaire were analysed with descriptive statistics to gain insights into teachers' awareness, perceived capacity and practices.

All interviews were summarised and sent to the participants for a member check (Merriam, 1988). Some teachers requested minor revisions. These revised summaries of the interview data were analysed in several cycles of thematic coding as suggested by Miles et al. (2014). In the first cycle of coding (a priori coding), the data were categorised into main codes and subcodes based on factors that derived from the theoretical framework, such as awareness, volition and sharing. In the second cycle of coding, codes and subcodes were added based on inductive coding. Once the main codes and subcodes had been defined and discussed in detail with the research team, the first author coded all data. In total, five main codes and 22 subcodes were identified. Table 2.5 shows the main codes used in this study including a description of each code. After completing the coding for each interview in Atlas.ti, matrices were used to structure the data. All sub-codes were plotted against the main codes to gain understanding of underlying factors. The first research question focuses on the main codes awareness and barriers. Subcodes within these themes enabled more specific analysis of the data. For example, sub-codes within barriers were 'time', 'searching', 'capacity' and 'culture' among others.

**Table 2.5**
*Codebook*

| Main code | Description of code |
|---|---|
| Awareness | Awareness of OER and Creative Commons |
| Behaviour | Behaviour in open sharing and reuse |
| Volition | Motives to share and use materials that others have developed |
| Barriers* | Factors that hinder (re)use of OER |
| Support | Support needed for (re)use of OER |

*Note*. * Availability and capacity are subcodes of barriers.

The main codes volition and behaviour were used to answer the second research question. Within the theme volition, subcodes elucidated underlying variables such as 'efficiency', 'supplementary' or 'quality'. To answer the last question, the code support was developed to analyse teachers' need for support to adopt OER.

To assure the overall quality of the research study, the audit procedure as described by Akkerman et al. (2008) was executed. An audit trail showed an auditor, who was not involved in the analysis of the data, the procedures of data collection and analysis for both the quantitative and qualitative data. It was concluded that the results were visible, comprehensible and acceptable.

## FINDINGS

In the subsequent sections, the findings of each layer of the Adoption Pyramid will be discussed. In each section, the questionnaire data will be presented after which the interview data will be used to illustrate or elaborate on the findings.

## Awareness, Capacity and Availability

*Awareness*

A little under half of the teachers (42.0%) indicated in the questionnaire that they have heard of OER. However, teachers' awareness on Creative Commons is more limited: 14.0% of the teachers know what it means. In the interviews it became clear that teachers may have heard of it, but that they are not familiar with the defining characteristics. This is illustrated by Sebastian who showed his confusion by asking: 'For me it's like, where does it start and where does it end? When is something open?' The findings from the questionnaire and interviews show that the current awareness is limited as teachers do not know how to recognise OER.

*Capacity*

The overall average of capacity shows that teachers perceive themselves as quite capable of using OER (M=3.32, SD=0.61). No significant differences were found based on gender, age and teaching experience. In the interviews, it became clear that some teachers do not know how to use or adapt OER due to their lack of awareness. At the moment, most teachers use resources based on their pedagogical needs, irrelevant of whether or not these resources are open. This is influenced by time constraints and therefore the need to prioritise as Chloe describes: 'There are ample opportunities, but I somehow do not have the time to explore it all.' A few teachers emphasised that their colleagues do not have the capacity to adjust or share OER as Sienna explains: 'With all due respect, we have colleagues that are excellent in teaching, but I'd rather not have them create, adjust or share resources as they are not well-versed to do so.'

*Availability*

The results from the questionnaire show that 11.2% of the teachers know where to search for OER. Teachers prefer using OER that are made by an author or institution with a good reputation (83.2%) or that are recommended by someone they know or trust (54.6%). Even though teachers stated that they prefer resources from an expert, in the interviews it became clear that content is decisive as Lily explains: 'Sometimes it is not clear who created the resource, but if I can verify it myself that the content is correct, then I might use it anyway.' Teachers emphasised that finding qualitative resources is difficult and requires a time investment, but that it is still worth it. George, for example, said that 'based on the way I search, around 80 or 90% is not usable, but you basically do it for that 10%.' Lily agrees with this because even though 'searching takes up time, I think the result is better than when I would create something myself.'

## OER Adoption

*Current OER adoption*

Table 2.6 shows the average use of resources ordered in frequency on the scale never (1) to often (5). The origins of these resources within five categories, ranging from openly licensed to more closed origins like publishers, can be derived from Table 2.6 as well. Most often used open resources are pictures (7.2%), video/audio (6.4%), e-textbooks (6.3%) and lecture recordings (6.3%). These numbers are low, but they only provide an indication of the current adoption. 'Dark reuse' might occur more often, especially because most resources originate from the Internet or from colleagues. As most teachers have limited awareness to recognize OER, reuse might be more prevalent than it appears in numbers.

Sharing resources occurs often, albeit mostly without an open licence. Based on the results of the questionnaire, half of the teachers (50.3%) share. Most resources are shared without any kind of rights (35.7%), with an open licence (7.7%), with copyright for the university (4.9%) or with copyright for themselves (2.8%). In the interviews, it became clear that most teachers mainly share within their own team or school. Teachers are a bit more hesitant to share outside their own school, as they are not convinced that the resources are of sufficient quality or distinctive enough. Or as Lily emphasises: 'sharing within our team [and] department happens, and it may be shared nationwide, but it is not that we have something to add to that. That we do something that others do not.' Matt on the other hand wonders why he would share: 'I am not going to promote resources we have and offer it openly available in a national meeting. I don't know why, but I just feel that it has cost us a lot of time to create it.' These two quotes make clear that Lily and Matt have a different view about ownership of the resources. Lily does not mind sharing resources on a national level; Matt, on the other hand, prefers exclusive use of the resources by containing their ownership.

*Volition to adopt OER*

In the interviews, it became clear that most teachers would like to use OER to improve the quality of education or to offer student flexibility within their educational programme. Reece, for example, mentions: 'there are phenomenal web lectures available via institutes [..] and well, based on that, I think we have to stop giving lectures by ourselves. […], and then create more interactivity, more in-depth meetings.' Volition to remix or adapt resources on the other hand is limited, as most teachers state that it will take too much of an effort whereas other teachers would like to create their own resources.

**Table 2.6**
*Average use and origin of resources*

| Resources | M | SD | Origin (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *Open* | *Internet* | *Own* | *Colleagues* | *Publisher* | *Commercial* | Total (n) |
| Pictures, infographics | 4.19 | 1.23 | 7.2 | 41.7 | 17.8 | 17.8 | 9.8 | 5.8 | 276 |
| Presentations | 4.11 | 1.29 | 2.6 | 12.6 | 43.7 | 31.6 | 7.4 | 2.2 | 231 |
| Video or audio | 4.05 | 1.09 | 6.4 | 48.6 | 11.8 | 18.6 | 8.6 | 5.9 | 220 |
| Rubrics | 3.53 | 1.50 | 1.3 | 3.3 | 41.8 | 48.4 | 2.6 | 2.6 | 153 |
| Assessments/test items | 3.25 | 1.52 | 1.2 | 6.0 | 48.8 | 31.0 | 11.9 | 1.2 | 168 |
| Short clips | 2.76 | 1.31 | 5.2 | 25.3 | 19.5 | 39.0 | 7.8 | 3.2 | 154 |
| Peer feedback | 2.37 | 1.34 | 1.7 | 5.1 | 44.4 | 44.4 | 1.7 | 2.5 | 117 |
| Digital portfolios | 2.23 | 1.41 | - | 4.7 | 30.2 | 62.8 | - | 2.3 | 86 |
| E-textbooks | 2.12 | 1.42 | 6.3 | 27.8 | 2.5 | 7.6 | 51.9 | 3.8 | 79 |
| Segments of existing courses | 2.02 | 1.30 | 3.6 | 17.3 | 28.2 | 38.2 | 4.5 | 8.2 | 110 |
| Games of simulations | 1.83 | 1.22 | 4.1 | 31.1 | 16.2 | 20.3 | 13.5 | 14.9 | 74 |
| Lecture recordings | 1.58 | 0.96 | 6.3 | 15.6 | 29.7 | 42.2 | 4.7 | 1.6 | 64 |
| Datasets | 1.56 | 1.09 | 4.7 | 23.4 | 29.7 | 28.1 | 10.9 | 3.1 | 64 |
| Existing courses | 1.29 | 0.80 | - | 20.7 | 24.1 | 44.8 | 6.9 | 3.4 | 29 |

Ralph explains that he values the work done by others and states: 'if I would have created it myself, I would have done it slightly different but if I read it and know I can tell my story with it, then I use the materials. […] Why else would you use a book that someone else wrote? That person spent a lot of time on it, and then you would do it all over again just because you'd like to use other examples or words.'

## Need of support

Teachers' need for support was only discussed in the interviews as these more experienced teachers could recount the kind of support they would like to have had when reusing or sharing resources. Table 2.7 shows the different aspects of support that were mentioned in the interviews by the specified number of teachers. In the subsequent sections, the need for support will be discussed in more detail.

**Table 2.7**
*Need for support as defined in interviews*

| Availability | Capacity | Institutional support |
|---|---|---|
| Overview (n=10)* | Technical (n=7) | Time (n=8) |
| Communities (n=10) | Pedagogical (n=4) | Vision (n=6) |
| Curated (n=4) | Training (n=2) | Culture (n=5) |
| | | Policy (n=4) |

*Note*. * n= number of teachers reporting this aspect.

### *Availability*

Finding OER is a main barrier for teachers as became clear in the previous section. When discussing the support teachers would like to have, almost all teachers explicitly said that they would like to have an overview of available OER within their teaching subjects rather than having to search for it themselves. Or as Sienna explains: 'if I could receive an overview of what is available […], that would be fantastic.' Some teachers mentioned that it would be even better if this overview were curated, or as Ralph emphasises: 'that it is something you can trust that it has quality and can be used.'

Another frequently mentioned method to increase the availability of OER is through teacher communities. As curricula are similar across institutes, collaboration with fellow teachers from other UASs can be beneficial. Or as Gary puts it, 'you would expect that with ten similar degrees in the Netherlands that there would be exchanges [between institutions], but it doesn't happen.' Even on a smaller scale, it could be beneficial; some teachers would like to form a community within the institute as Lily explains: 'Right now [collaboration] is very ad hoc, random and purely fortuitous. Maybe a database [in which] I can search who teaches [my course], that would be a big advantage already. A database who does what, who has which specialisation so that it becomes possible to contact [teachers] outside your own school.'

*Capacity*
Provided that teachers have availability of OER, most teachers also emphasised the need for technical and pedagogical support in using and sharing OER. Sienna stresses: 'the first thing that is needed, is technical support. How does it [adoption] work?' Ralph already shares his materials but likes to share it outside his network as well, but 'someone who has the expertise can meta-data it so that it can be found.' In addition to this, some teachers also mention the need for pedagogical support. The main need for teachers is to understand how OER could benefit their teaching and student learning; as Chloe says: 'that is probably my wish regarding OER, how can exercises and assignments scaffold students' drive to study.' Two teachers specifically mentioned the need for formal training sessions. Reece, for example, suggests that 'a serious course with proper assignments and with the objective that it [OER] must be integrated in the curriculum' would be helpful.

*Institutional support*
Teachers believe it is important that there are supporting conditions within the institute to increase OER adoption. Most agreed on a limitation being the lack of time, which reduces their chance to explore the opportunities of OER, learn from each other, and be able to exchange resources and practices. Almost half the teachers experience a lack of vision and culture that encourages teachers to use and share OER. Sebastian, for example, is a novice teacher and he observes: 'it is not the culture, so as a new teacher I adjust to this culture. There is no culture at all to share, and that is a shame.' A policy on OER might help for some teachers to create awareness about OER and the guidelines used in the UAS. Matt accentuated this by saying: 'I do not know what the rules are, […] you first have to make agreements about that on a central level.'

## CONCLUSIONS AND DISCUSSION

Although over the years the conceptual understanding of OER has improved, more insights are needed on teachers' practices with OER (Beaven, 2018; Schuwer & Janssen, 2018). This study aimed to explore teachers' practices and to elicit the need for support to foster OER adoption within a Dutch University of Applied Sciences. The OER Adoption Pyramid of Cox and Trotter (2017) was used as a conceptual framework. Based on the findings of this study, it can be concluded that the OER Adoption Pyramid does not properly describe the sequence of each layer within the context of this study. The findings indicate that the layer of availability must be lower in the pyramid as a prerequisite for teachers to explore their capacity and volition. The findings of the posed research questions will be discussed in the following sections.

### Awareness, availability and capacity

Currently, most teachers select resources on the basis of the pedagogical benefits they offer, regardless of whether they are openly available. Most teachers think that OER are an equivalent of all available digital resources, which is a known issue

(Belikov & Bodily, 2016; Ozdemir & Bonk, 2017). It is therefore important to increase awareness as OER not only offer teachers the advantages of '5R', but also decrease the risk of receiving an institutional claim on improper use of copyrighted materials from the Dutch organisation 'Stichting UvO' (n.d.).

Availability of OER is the main concern teachers have. The absolute number of OER available has increased in the past decade (Creative Commons, 2017), but teachers emphasise the effort and time investment that are required to search, find and evaluate OER. This is strengthened by their availability being dependent on not only the actual number available, but also to their relevance as determined by the user based on the characteristics of OER (e.g. content, scope, level, language), the extent they fit the anticipated use and the perceived quality of those OER (Cox & Trotter, 2017). According to the OER Adoption Model, availability is near the top as it is a factor teachers have personal control over. However, even though there are many available repositories in which teachers can search for OER, teachers are not specialists in finding resources.

If teachers find a resource that would be of interest, then capacity will become an issue. Most teachers mentioned that the technical capacity to adapt OER is a concern, which is partly related to their limited awareness. Some teachers mentioned that they would encounter pedagogical issues when integrating OER in their curriculum. This might be explained due to the fact that teachers in a Dutch UAS have worked in a profession before becoming a teacher. In-service teacher training provides the necessary pedagogical skills and knowledge. In the Netherlands, the theme OER is however, often not included in this (Lam & De Jong, 2015).

### OER adoption and volition

The current adoption of OER reflects the findings on teachers' awareness, capacity and the availability. This study shows that adoption of OER occurs but is minimal. However, 'dark reuse' could influence these results as teachers might not be aware of using OER or they might unconsciously engage with OER by using resources from other sources (e.g. colleagues, previous courseware). If adoption occurs, it is either 'as-is' to supplement existing curricular content or as a source of inspiration when developing resources. Adapting resources appears to be less common, mainly due to time restraints and a lack of skills. While it might be less time-consuming to use a resource 'as-is', it will limit the fit between the resource and a teacher's teaching style, the learning objectives and the need of the students (Hood, 2018).

Although it appears that current adoption is limited, more insights are needed on the amount of 'dark reuse' occurring in Dutch higher education. Especially as the findings show that sharing occurs often albeit within the boundaries of the institution and without the use of open licences. This is in accordance with the findings of Rolfe (2012), which showed that local small-scale sharing is more common than formal ways of sharing. From a practical point of view, this local small-scale sharing can be beneficial as resources are already context

specific. Yet this is merely practical as innovation will probably fail to transpire (Perryman & Coughlan, 2014). As of 2018, the funding policy of the Dutch Ministry of Education, Culture and Science has allocated a part of its funding to the creation of domain-specific national teacher communities on OER. Although it is known that communities could be efficient and effective as teachers will be aware of each other's expertise and commit to the exchange of resources (Cross et al., 2002), little is still known about the impact national domain-specific communities can have on adoption of OER.

Volition to adopt OER is present as most teachers value OER as a means of improving the quality of education or of increasing flexibility in curricula. Within a Dutch UAS, this is especially relevant due to the direct link in the curriculum between theory and the work field. It enables teachers to spend more time on acquiring skills during classes. It also allows students to have access to the resources to either prepare for classes or when encountering difficulties whilst in the field.

### Teachers' need for support

Based on this explorative study, the importance of supporting teachers to foster OER adoption is stressed. The following recommendations are formulated for school leaders, educational support services and librarians. The first recommendation focuses on availability. Librarians might take the lead in searching, selecting and curating OER, and work together with other departments within the institute to advocate OER (Miller & Homol, 2016). Librarians could be supported by semantic search technologies (Little et al., 2012) as well as by the formulated guidelines of Hassler et al., (2014) and Brent et al., (2012) on the development of an OER collection. It would, however, be futile to improve availability without increasing teachers' awareness of OER.

The second recommendation therefore focuses on the need for an institutional policy that enables supporting conditions within the institute. The policy should be connected with developments within the institute; for example, during curriculum reforms or with the transition to blended learning (Schuwer & Janssen, 2018). As individual teachers or teacher teams define the curriculum and the resources that are used, awareness can be improved by joint efforts of school leaders, educational support services and librarians during curriculum reforms. Teachers must be made aware of the policy of their institute, the OER collection that is made accessible and also how to adopt OER in their curriculum.

Hence, the third recommendation is based on the findings that some teachers would like to know more on the pedagogical and technical use of OER. Integrating OER as part of the basic in-service teacher training as well as on-the-job support by educational support services, for example instructional designers, could increase awareness and enable teachers to take advantage of the '5R' characteristics when adapting an existing course or if participating in a curriculum reform.

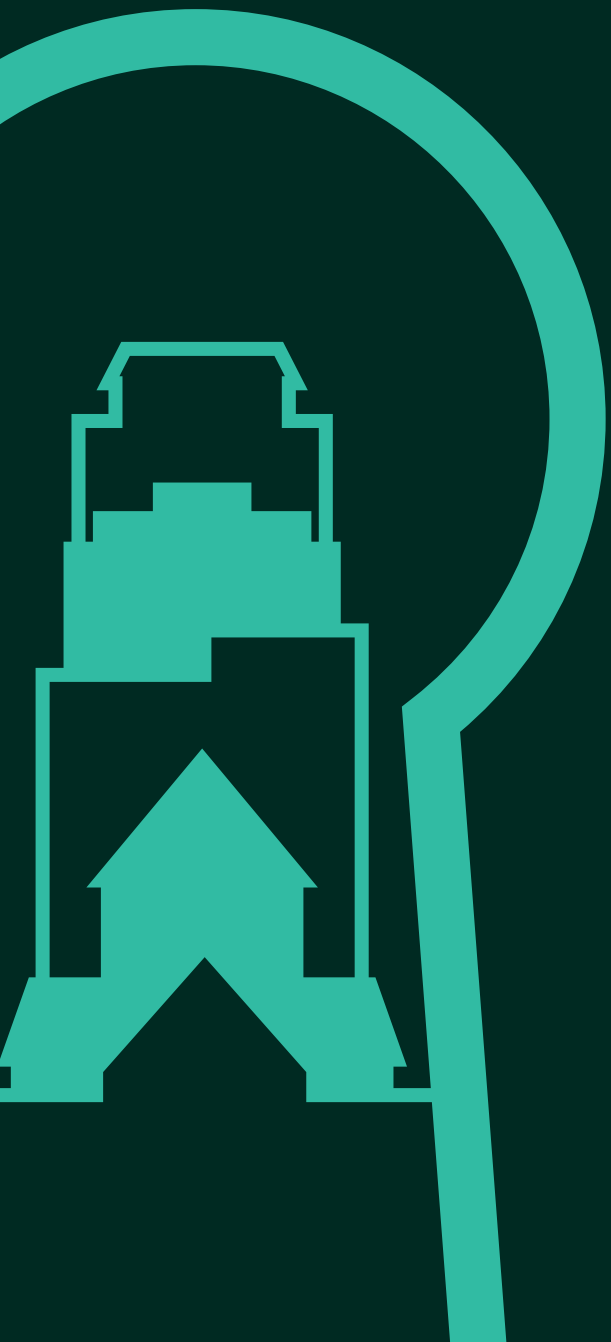
## Limitations and future research

Two aspects of the study limit its conclusions. First, the questionnaire was distributed online, and teachers volunteered to participate. This could have resulted in a response that might not reflect the overall situation at the UAS. The findings, however, are in line with the study by Schuwer and Janssen (2018) in which an overview of OER adoption in Dutch higher education was provided. For future research, it would be valuable to also investigate the time factor and the concept of 'dark reuse' in more detail. Second, teachers with some experience with OER were interviewed using a retrospective approach. This resulted in more generic findings. Further research should aim to increase the quality and in-depth understanding by designing a qualitative study that focuses on one specific project or case in which teachers engage with OER. As a result, it will become possible to identify to what extent context, both geographical and the level of education, defines the sequences and layers of the OER Adoption Pyramid.

## Concluding remarks

The findings of this study complement the results of Schuwer and Janssen (2018) in which an overview of the current adoption in the Netherlands was established. Insights on the OER Adoption Pyramid within the context of a Dutch UAS have been provided. The findings imply that the sequence of the OER Adoption Pyramid might differ based on context. Within the context of this study, availability must be lower in the pyramid as a prerequisite for teachers to explore their capacity and volition. To construct an understanding of how daily teaching practices and curricula can be supported by OER, more research is needed.

# 3



# Would you use them? A qualitative study on teachers' assessments of open educational resources in higher education

This chapter is based on:
Baas, M., Van der Rijst, R., Huizinga, T., Van den Berg, E., & Admiraal, W. (2022). Would you use them? A qualitative study on teachers' assessments of open educational resources in higher education. *The Internet and Higher Education, 54*, 100857. https://doi.org/10.1016/j.iheduc.2022.100857

**ABSTRACT.** The quality of open educational resources (OER) has been a continuous topic of interest over the past two decades, because it is intertwined with the adoption of these resources. In previous research the quality of OER has been defined on the basis of quantitative or usage data, but few qualitative insights are available. In this study we analysed how teachers collaboratively assessed 'big' OERs, and whether changes occurred in teachers' perceptions of OER by means of collaborative dialogue about the quality of these resources. Five core themes were elicited: (1) content, (2) design, (3) usability, (4) engagement, and (5) readability. Changes we discerned in teachers' perceptions relate to their awareness, attitude and practical issues in relation to OER. Higher education institutes aiming to increase the use of OER should encourage conversation on OER in teacher teams during curriculum reforms, and provide support for the adaptation of resources to teachers' instructional needs and their specific teaching contexts.

## INTRODUCTION

On the internet teachers have access to a vast amount and wide variety of digital resources. The use of most of these resources is restricted due to copyright issues, but a growing number of resources has become available that permit re-use. These so-called Open Educational Resources (OER) are unique due to the '5R' characteristics (Wiley, n.d.), which enable teachers to retain, re-use, remix, revise and redistribute these resources. This allows teachers for instance, to adapt the resources to their specific teaching needs. Nevertheless, adoption of OER in higher education appears to be limited (Baas & Schuwer, 2020; Bozkurt et al., 2019; Moore & Reinsfelder, 2020), because of several barriers (Cox & Trotter, 2017). One of these barriers relates to the availability of relevant OER of the required quality. Teachers perceive availability as a major issue (Baas et al., 2019), despite the fact that the absolute number of OER has increased tremendously over the last decade (Creative Commons, 2017). Teachers struggle to find resources that are relevant, up-to-date, and of good quality (Admiraal, 2022). Librarians prove pivotal in supporting teachers in higher education regarding the adoption of OER (e.g. Miller & Homol, 2016; Reed & Jahre, 2019), because they can help teachers to find suitable OERs. Still, the relevance of a resource is best assessed by teachers themselves because they are the pedagogical and content experts (Gros & López, 2016; King, 2017). Thus, the way teachers perceive the availability of resources emanates from their personal assessments of the resources' characteristics, perceived quality, and fit with the anticipated use of the resource (Cox & Trotter, 2017). Several organizations and institutes offer rubrics to support teachers in this process. For example, Achieve (2011) has published an online evaluation tool; the OER librarians of the BCcampus institute have published a Faculty Guide (BCOER, 2015); and some researchers have created the OER assessment rubric (Morehouse et al., n.d.). Even though there are many rubrics available that could offer teachers some guidance, these have often not been empirically tested (Yuan & Recker, 2015). Also, most studies to date have tended to focus on quantitative measures of OER quality compared to that of traditional resources as defined by teachers' (Abramovich & Bride, 2018; Clements & Pawlowski, 2012; Kimmons, 2015), reviewers' (Fischer et al., 2017), and students' perceptions (Cuttler, 2019; Howard & Whitmore, 2020; Nipa & Kermanshachi, 2020; Morales & Baker, 2018; Oelfke et al., 2021). Other studies examined teachers' perceptions of the quality of traditional resources (Ayala Doval & Gómez-Zermeno, 2017; Karolčik et al., 2017), but again only quantitative measures were used. Existing qualitative research on teachers' assessments of OER (Belikov & McLure, 2020; Watson et al., 2017) shows teachers' considerations of the quality of specific resources, but these studies only focus on Open Textbooks. Although the studies mentioned earlier have provided important information on the quality of resources as perceived by teachers, reviewers, and students, insufficient attention has been paid to the qualitative process of teachers' evaluations of OER. Further empirical studies on teachers' assessment and selection of resources is needed (Belikov & McLure, 2020; Leighton & Griffioen, 2021). Improving our understanding of the evaluation

process is essential if we want to increase OER adoption, because it provides insights into teachers' criteria regarding whether to adopt a specific resource or not. This is especially important since considerable literature has grown up around the positive impact of OER on students' achievements (e.g. Clinton & Khan, 2019; Hilton et al., 2019; Sansom et al., 2021). The importance and originality of the descriptive study presented here is that we explored the qualitative process of teachers' assessments of OER, with the aim to contribute to the growing body of research on OER quality.

## Assessment of OER quality

*Quality of Resources*

The quality of resources has been a continuous topic of interest over the past two decades (Kay & Knaack, 2008; Kurilovas, Bireniene, & Serikoviene, 2011; Leacock & Nesbit, 2007; Strijker, 2004), and is still an important issue that relates to OER adoption. Quality is relevant for all phases of the OER re-use process (Clements & Pawlowski, 2012). Clements and Pawlowski distinguished five phases that teachers go through when re-using OER (see Figure 3.1): teachers (1) *search* for resources and (2) *evaluate* them to determine their suitability; next, teachers determine if and how the resources need to be (3) *adapted,* or (4) *use* them in the relevant context, after which the adjusted resource could be (5) *shared* back with the community.

Figure 3.1
*Re-use process for teachers re-using OER (Clements & Pawlowski, 2012)*


The initial assessment on quality occurs in the first two phases of the re-use process, when teachers search for and evaluate OERs. As indicated in the Introduction, finding relevant and adequate OERs (phase 1) is experienced as a major challenge by teachers. Existing research recognizes the critical role played by support staff such as librarians (e.g. De Jong et al., 2019; Katz, 2020; Reed & Jahre, 2019), for example in helping teachers to find OERs. In this first phase the granularity of OER may predefine a certain level of quality, since two main categories of OER can be characterized: 'big' and 'little' OERs (Weller, 2010). 'Big' OERs are created by institutes, are often of high quality and are designed with explicit teaching aims, whereas 'little' OERs are individually created, may not have explicit educational aims, and are made at lower costs, often resulting in low production quality. Although granularity may give an indication of quality, the evaluation of resources (phase 2) determines the suitability of the resources found. Previous research has sought to identify teachers' criteria for the evaluation of resources. Clements and Pawlowski (2012) found that according to secondary

education teachers quality resources make good use of multimedia, are scientifically correct, fit the lessons or curriculum, can be used interchangeably within the virtual learning environment, and come from an organization with a good reputation. Karolčík and colleagues (2017) explored primary and secondary education teachers' criteria and found that teachers valued clarity, ease of use, and correctness of the content as fundamental characteristics. Whereas the beforementioned studies took a quantitative approach to identify quality, Belikov and McLure (2020) used a qualitative approach to analyse 954 open textbooks reviews on ten quality indicators: comprehensiveness; accuracy; relevance and longevity; clarity; consistency; modularity; organization, structure and flow; interface; grammatical errors; and cultural relevance. They found that open textbooks were less consistent in organization, structure and flow, and writing, but that this was compensated by modularity which empowers teachers to extract or reorder the textbooks. The findings of these previous studies are corroborated in a review study by Leighton and Griffioen (2021), which indicates that higher education teachers look at the reliability of the resource, pedagogical quality, visual design quality, and alignment with their course objectives when selecting resources.

Because teachers curate their collection of resources themselves, they can decide to revise resources in order to make them fit their teaching needs better (phase 3). On the basis of her findings in a qualitative study, Hood (2018) defined two separate processes: personalization and localization. Teachers not only adapt resources to their teaching style and instructional needs, but also localize the resources so that they are appropriate and applicable to the school and classroom contexts, and meaningful and relevant to students. However, even if teachers revise resources, the degree of adaptation depends on the type of users they are (passive users, active adopters, or innovative re-designers) and the level of confidence in their own technological skills (Pulker & Kukulska-Hulme, 2020).

Often, quality assessment is also examined *after* teachers have used OERs in their teaching (phase 4). Kinskey and colleagues (2018), for example, examined quality from a student perspective and found that students valued OERs because they are interactive, easy to use, and free of charge. Students often especially appreciate the last aspect which can even lead to positive changes in their perception of the quality of a resource (Howard & Whitmore, 2020). In contrast, this same aspect can also lower students' perceptions, because some believe that free resources are inferior to traditional resources (Abramovich & McBride, 2018). Other studies examined quality from the perspective of the question whether OER, in this case open textbooks, replaces traditional resources. Kimmons (2015) explored teachers' evaluations of both copyright-restricted resources and open textbooks and found that open textbooks were evaluated as higher quality. The same findings were underlined by studies that explored students' perceptions of OER compared to traditional resources (Cuttler, 2019; Howard & Whitmore, 2020; Nipa & Kermanshachi, 2020; Morales & Baker, 2018; Oelfke et al., 2021). Within Cuttler's study, for example, students scored open textbooks significantly higher on 11 of 15 quality dimensions than traditional resources. More recently, various studies have

also indicated that OERs are not only perceived as qualitatively better than traditional resources, but also positively affect students' achievements (e.g. Clinton & Khan, 2019; Hilton et al., 2019; Sansom et al., 2021). Clinton and Khan, for example, found that courses using open textbooks had lower withdrawal rates than those in which commercial textbooks were used.

Lastly, resources can also be shared back to the community (phase 5). A challenge when allowing resources to be shared is that question if there should be a quality check. A combination of quality management processes can be applied to approach this issue of quality (Hylén, 2006). For example, central institutional quality procedures or peer review schemes can be utilized to guarantee the quality of resources to be shared.

In this qualitative study we specifically focused on the 'evaluation' phase because teachers can be seen as curators of their own collection of resources, 'selecting and structuring resources for educational purposes, while providing context and a coherent presentation for a particular audience' (Leighton & Griffioen, p. 3). Throughout this paper we therefore use the description that a quality resource is a resource that has characteristics which, according to a teacher, are essential and determine whether the resource will be included in the teaching process (cf., Karolčík et al., 2017). However, because the large number of resources makes searching for OERs an arduous undertaking, digital tools have been developed to support teachers in finding and evaluating these resources.

*Tools for quality assessment*

Over time, several types of quality assessment tools have been implemented to guide teachers towards effectively assessing resources. These tools focus either on the evaluation of resources in online repositories, or on rubrics that offer teachers guidelines. Previous studies have offered analyses on, for example, the extent to which the selection of high-quality resources from online repositories could be supported by evaluative metadata (Abramovich & Schunn, 2012), peer reviews and user comments (Cechinel & Sánchez-Alonso, 2011; Clements & Pawlowski, 2012; Kelty et al., 2008), automated analysis (Başaran, 2016; Cechinel et al., 2011), or usage data (Kurilovas et al., 2011). Other studies focused on the importance of quality assurance in OER repositories, by providing quality indicators for designing effective repositories (Atenas & Havemann, 2014; Atenas et al., 2014; Clements et al., 2015). Whereas these tools are aimed at developers of repositories, other tools are specifically aimed at teachers. Rubrics are provided to help teachers judge the quality of resources. Initially rubrics were directed at evaluating learning objects, for example the *Learning Object Review Instrument* by Leacock and Nesbit (2007) or the *Learning Object Evaluation Metric* by Kay and Knaack (2008). Currently, however, there are also specific rubrics available for OER. The *TIPS Quality Assurance Framework* (Kawachi, 2013), for example, guides designers towards publishing high-quality OER; *the COUP framework* addresses the Cost, impact on Outcomes, Use, and Perceptions of OER (Bliss et al., 2013), while the *Framework*

*for selecting OER on the basis of fitness for purpose* (Jung et al., 2016) supports teachers in their assessments of OER. Because there are numerous rubrics available, Yuan and Recker (2015) decided to explore the range of rubrics that support teachers in assessing the quality of OERs. A total of 14 rubrics were selected and reviewed in terms of content (e.g. indicators that could be rated and scored), development process (e.g. whether the rubric was tested and revised), and application context (e.g. generic or specific). They found that some rubrics contained unique indicators or emphasized different aspects, but most rubrics were quite similar in content. Good rubrics contain useful quality indicators with detailed accompanying guidelines, but must also provide opportunities to revise or adjust to the needs of school or students (Yuan & Recker, 2018).

Although this wide range of tools can mediate the process in which teachers search, find, assess and select OERs, they are still best assessed by teachers themselves as they are the pedagogical and content experts (Gros & López, 2016; King, 2017).

## Aim of this study

OER quality is especially of interest within the context of this study, because the Dutch government has stressed the importance of OER adoption in order to enhance student learning (OCW, 2019). To stimulate teachers to create, share and use OER, a national funding policy for higher education institutes was initiated. Furthermore, an acceleration plan (VSNU et al., 2017) was presented in 2018, in which a total of 40 research universities and universities of applied sciences are expected to collaborate between 2019 and 2022 to achieve substantial gains in digitalization in higher education. One of these intended gains is that by 2023 teachers and students will be able to compile and use an optimal mix of (open) educational materials with minimal barriers. To understand what an optimal mix of resources entails we should first and foremost improve our understanding of the elements higher education teachers take into account when assessing resources on quality. Yet, previous research has been primarily based on quantitative or usage data, whereas few qualitative and empirical insights are available. A qualitative research design can improve our in-depth understanding of the process of teachers' assessments of OERs. In our qualitative study teachers were asked to collaboratively assess 'big' OERs within their teaching subject. We opted to focus on 'big' OERs because these usually have an institutional endorsement, which makes them suitable as a first step towards reuse (Almendro & Silveira, 2018). Second, current literature lacks a focus on how underlying attitudes and beliefs influence the way teachers select and structure resources for educational purposes (Leighton & Griffioen, 2021). This is especially relevant for OER, because issues on OER adoption often revolve around teachers' lack of awareness (Baas et al., 2019) or differences in perceived value due to the defining characteristics of specific OERs (Abramovich & McBride, 2018).

The aim of our study, therefore, was to characterize the elements teachers take into account when assessing OER quality, and not to make general statements on what defines a quality OER. With this purpose, the study was conducted to (1) explore what elements higher education teachers take into account when assessing 'big' OERs on quality, and (2) if and how their perceptions of OER changed due to their interaction with it.

## METHOD

### Context

Universities of applied sciences are higher education institutes with profession-oriented education programmes. This study was conducted in a large university of applied sciences with various campuses in the Netherlands. The institute has no policies, incentives, or specific services on OER, but aims to increase OER adoption in curricula according to the national ambitions. The institute has 13 schools, in which approximately 1200 teachers are employed and almost 27,000 students are enrolled.

### Participants

We recruited teachers for this study through an open call on the university's intranet. Eligibility criteria required teachers to teach within the subject of Business Analytics (BA), Intercultural Communication (IC), or Research Methods (RM). These subjects were chosen because they are taught across several schools. Fourteen teachers responded to the call, but only eleven of them actually participated in this study. Three teachers decided not to participate due to teaching responsibilities and scheduling issues across campuses. Each subject group, made up of three or four teachers, came together once to discuss a number of OERs provided by the authors. Participants' ages ranged from 33 to 63 years, and their experience in teaching in higher education varied from 1 year up to 14 years. In Table 3.1 the pseudonyms and demographics of the participating teachers are presented.

### Procedure

After ethical clearance was obtained from ICLON-Graduate School of Teaching at Leiden University, we conducted a pilot study which resulted in minor changes in the research procedure. A visual representation of the final procedure is shown in Figure 3.2. Beforehand teachers received an information letter with details of the design and purpose of the study. All teachers participated voluntarily, and data were collected only after gaining informed consent. The first author was responsible for data collection.

**Table 3.1**
*Demographics of participants*

| Subject | Pseudonym | Age | Experience in years |
|---|---|---|---|
| Business Analytics (BA) | Ray | 44 | 10 |
| | Joe | 56 | 13 |
| | Kyle | 33 | 1 |
| Intercultural Communication (IC) | Andy | 43 | 10 |
| | Chelsea | 41 | 12 |
| | Jake | 37 | 5 |
| | Stephanie | 53 | 12 |
| Research Methods (RM) | Terry | 63 | 14 |
| | Amy | 33 | 8 |
| | Rosa | 35 | 4 |
| | Melissa | 46 | 10 |

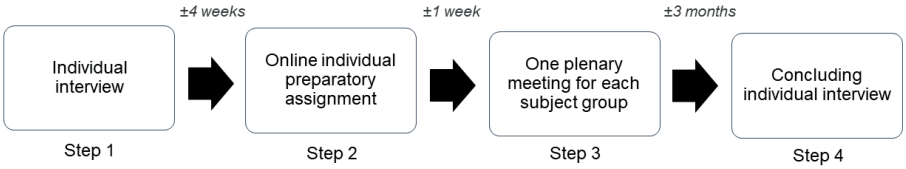
The first step in this procedure was to schedule an initial individual interview with each participant approximately four weeks before the plenary meeting. At the beginning of this individual interviews each teacher was asked to make an association map about OER. Only after teachers finished the map did the first author explain the concept of OER in detail. Once teachers were familiar with the defining characteristics of OER, they had the opportunity to request topics within their subject (BA, IC or RM) on which they would like to explore OER. Librarians can streamline the process of OER adoption (Davis et al., 2016), so we involved them in the search for relevant OERs. Criteria for selection were: content (resource must contain the topics as defined by the teachers), granularity (only 'big' OERs), type (a diverse selection of OERs), language (only Dutch or English), and publication date (published in 2015 or later). On the basis of these criteria, a mix of two Open Textbooks, one Open Online Course and one OpenCourseWare resource was selected for each subject group. The OERs discussed can be found in Appendix B.

In the second step of the procedure, teachers received the links to all OERs that were selected for their subject group around one week before the plenary meeting was scheduled. Teachers were asked to execute an individual online preparatory task, which ensured that they had viewed the resources before the plenary meeting.

In the third step one plenary meeting for each subject group was scheduled. During this meeting teachers discussed the resources selected for their particular subject. Given that teachers were sure to have questions during these collaborative assessments of the OER, the librarian involved joined each meeting. The first author was the moderator of the plenary meetings, whose role was to ask teachers to introduce themselves, ask initial questions, and invite questions if necessary; the librarian was available to answer any questions teachers had about OER.

The final step consisted of the concluding individual interviews. These took place approximately three months after the plenary meetings. In these interviews each teacher was again asked to create an association map about OER. Afterwards, they were invited to reflect on the plenary meeting, and to share whether they had adopted any of the OERs provided.

**Figure 3.2**
*Research procedure*




## Data collection

In this section, we present the data collected to answer the research questions. References to the steps in the procedure show at what stage the data were collected (see Figure 3.2).

*Association maps (steps 1 and 4)*

We collected association maps in step 1 (pre map) and four months after that in step 4 (post map). The maps were constructed on A3-size, landscape sheets with the term 'open educational resources' in the middle. We gave each teacher the following instruction: What do you associate with the term open educational resources? Write down everything that comes to mind, there are no wrong answers. The teachers were allowed to take their time. When finished, teachers were asked to comment on their map. In the concluding individual interview (step 4), their pre map was placed next to their post map. We then asked teachers to evaluate both maps: If you compare your first and second association maps, what strikes you?. Maps were retained by the researchers for further analysis.

*Plenary meetings (step 3)*

The plenary meetings scheduled for each subject group all lasted two hours, so that approximately 30 min were allocated to the discussion of each OER. Due to time limits the Intercultural Communication group discussed only three resources. For each resource, teachers were asked to share their responses on the following two questions: (1) what is your first impression of this resource? and (2) would this resource be useful for your curriculum? The conversation evolved around these questions, after which the teachers were asked to finish the time allocated for this resource by answering the following question as a group: (3) would you recommend the resource to your colleagues? All three collaborative sessions were audio-recorded, lasted between 90 and 120 min, and were transcribed verbatim.

*Concluding individual interviews (step 4)*
To reflect upon the preceding months, the first author scheduled concluding individual interviews approximately three months after the plenary meetings. We were able to interview all teachers, except for Jake and Stephanie, who dropped out due to care leave and illness. In these semi-structured interviews we used prompts to identify teachers' motives to explore OER, to reflect on the plenary meeting, and to examine whether they had used any of the OERs provided, and to understand if and how they valued the defining '5R' characteristics of OER. The interviews lasted between 25 and 60 min and were summarized for analysis.

## Data analyses

*Analysis: First phase*
The first phase of the analysis consisted of two steps. First, the meeting and interview transcripts of each subject group were divided over separate Excel tabs, one for each OER that was discussed. Then, the data were read intensively and the 'two-column method' based on Argyris and Schön (1974) was used to analyse teachers' conversations on each OER. The verbatim text was placed in one column, and another column was created to note annotations regarding teachers' comments. Second, we created teacher descriptions on the basis of the data collected. Comparisons between teachers' pre and post maps were made through a content analysis. Each teacher description consisted of the changes in their maps, highlights of the remarks in the plenary meeting, and a summary of the concluding individual interview. Subsequently, in an iterative process we refined each teacher description by moving between the preliminary descriptions and the data collected. These detailed teacher descriptions were used in the second phase of the analysis.

*Analysis: Second phase*
The second phase of the analyses consisted of three steps. First, we specifically focused on an extensive analysis of the verbatim data from the plenary meetings. The annotations and the detailed teacher descriptions we had created in the first phase were used to formulate themes on which teachers had discussed the OER. The themes and related subthemes derived from this analysis were arranged into a table. We validated these themes by coding the verbatim text and by going back to the teacher descriptions. The final themes that emerged from teachers' collaborative dialogues were discussed and agreed upon in the research team. Five main themes were identified: content, design, usability, engagement, and readability.

Next, teachers' comments on each OER were given a positive, a negative, a neutral, or no score. A positive or a negative score was given if teachers evaluated an element either positively or negatively. Neutral comments were scored if teachers just described an element, if teachers evaluated an element both positively and negatively, or if teachers made remarks about the practical implications of using the resource. If teachers did not have any comments on a resource, no score was

assigned. The main researcher was responsible for scoring the teacher comments for each resource. Scoring was discussed in the research team until consensus was reached. Table 3.2 contains the final themes and scores for teachers' remarks on each OER.

*Validating the data analysis*
To ensure quality, an independent researcher assessed the overall quality of the data collection, analysis and report of the results on the basis of an audit procedure (Akkerman et al., 2008). The auditor examined the audit trail of this study, which consisted of the procedures of data collection, data analysis, and the findings. The conclusion was that the research process of data collection, data analysis, and report of results was visible, comprehensible and acceptable. The auditor report is available on request.

## FINDINGS

### Teachers' assessments of quality
Five themes derived from teachers' conversations, relating to (1) content, (2) design, (3) usability, (4) engagement, and (5) readability. For each theme, quotes or an excerpt of a conversation are provided to illustrate how these themes were part of teachers' assessments.

*Theme 1: Content*
As could have been expected, the first theme relates to (1) the *content* of the resource. The criterion mentioned most often is the *relevance* (1a) of the content for the curriculum. Teachers examined whether all or part of the content fit their learning objectives. This partly relates to the *scope* (1b) of the content, as this could be either very extensive or narrowly focused. Stephanie (IC), for example, explained that the scope of OER1 is all-encompassing, which enables her to select relevant elements. Also, several teachers emphasized that the content and examples provided must relate to *students' future professions* (1c). However, some teachers objected that it was impossible to design OERs that relate to all contexts. An excerpt of such a discussion is given in Table 3.3. Other elements that appeared in teachers' considerations was the *correctness* (1d) and the *structure* (1e) of the content; they consider it important that the structure is logical and coherent. For example, Ray (BA) explained why he does not agree with the structure of OER4: 'What you're saying there is, you're comparing three things, but these Excel techniques are totally incomparable. The first is synchronized swimming, the second is aviation, and the third is shoelace tying.'

**Table 3.2**

*Overview of teachers' comments on the elements within the five themes*

| Theme | Elements | Business Analytics (BA) | | | | | | | | | | | | Intercultural Communication (IC) | | | | | | | | | | | | | | | | | | | | | | | | Research Methods (RM) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ray | | | | Joe | | | | Kyle | | | | Andy | | Chelsea | | | Jake | | | Stephanie | | | Terry | | | | Amy | | | | Rosa | | | | Melissa | | | |
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Content | Relevance | - | | - | | + | + | - | | + | + | + | | | | o | - | | | + | + | + | + | + | - | o | - | | o | + | + | + | | - | o | | | + | + | | + |
| | Scope | - | | - | - | + | | | - | o | - | | - | + | | | | | | + | | | + | + | - | | - | | + | | o | | | o | | o | o | + | | + |
| | Future profession | - | - | | | | + | | - | - | + | | | | | | | | | | | o | | - | | | | - | | | | o | | | - | o | | | | + | | |
| | Correctness | | | | - | + | | | | o | | + | | | o | | | o | | o | | o | | | | | | - | | | | - | | | | - | | | + | | | | |
| | Structure | | | + | - | + | | | - | | | | - | | | + | + | | | + | + | + | | + | | | | | | | | | | | | | | | | | | | |
| Design | Pedagogical design | | | | | | | - | | - | | | - | - | o | + | - | | + | | - | o | | - | o | | | - | | | + | o | | | - | - | | + | o | o | | + |
| | Granularity | | | | | | + | | | | + | | | + | + | | + | | | + | | o | - | + | | | | | | - | | | + | | | | + | | | | | | + |
| | Looks | + | | | | | | | | - | | | | | + | | + | + | | + | + | | | + | | | | | | | | + | | | | + | | | | | | | |
| | Learning modalities | | | | | | | | | | | | | | + | | | | | | | + | | | | | | | | | | | - | | | | - | | | | - | |
| | Developer | | | | + | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | | | | | | | | | |
| | Production date | | | | | | | | | | | | | + | | | | | | o | | | | | | | | | | | | | | | | | | | | | | | |
| Usability | Layout | | | | | + | + | | | | + | | - | | + | + | + | | | + | + | | | + | | | | - | | | | | - | | | | - | | | | - | | + |
| | Navigation | + | | | | | + | | | + | + | | - | - | | | | + | + | | | | + | | | | o | | | | | | + | | | | o | | | | | |
| | Utility | + | + | | | | + | | | | + | - | | | | - | | | | - | | | | | | | | | | | | | | | | | | | | | | | |
| | Access | | | | | | | | | | + | | | + | | | | | | | - | | | | | | - | + | | | - | + | | + | | | + | - | | | | | |
| | Insight in students' progress | | - | | | | - | | | | | | | | | o | | | | o | | o | | | | | | | | | | | | | | | | | | | | | | |

| Theme | Elements | Business Analytics (BA) | | | | | | | | | | | | Intercultural Communication (IC) | | | | | | | | | | | | Research Methods (RM) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ray | | | | Joe | | | | Kyle | | | | Andy | | | Chelsea | | | Jake | | | Stephanie | | | Terry | | | | Amy | | | | Rosa | | | | Melissa | | | |
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Engage-ment | Exercises | + | | - | | | + | | | - | + | | - | | | | | | | | | | | - | | | | | | | + | | | | o | | | + |
| | Videos | | | | + | | | | - | | | | + | + | | o | | | - | o | o | o | | - | | | | | | | | | | | | | | |
| | Feedback | | | | | | + | | | | + | | | | | | | | | | | | | | | | | | | | | | | | o | | | | o | | | + |
| | Interactivity | + | + | | | | + | | | - | + | - | | | | | | | | | | | | | | | | | | | | | | | | | | + | | | |
| | Progress bar | | | | | | + | | | + | + | | | | | + | | | + | | | | | | | | | | | - | | | | | | | | | | |
| Read-ability | Language | - | + | - | | o | o | | | o | o | - | | | | | | - | | | | | | - | | | - | - | + | o | | | + | o | | | | | + | o |
| | Level of language | | | | | - | | | | | | | | | | | | | | | | | + | | | | | | | + | | | o | - | - | + | | | | | |
| | Style of writing | | | | | | | | | | | | | | | | | | | | | | | | | - | | | | + | o | | | - | - | | | - | o | | |
| | Length of text | | | - | | | | | | - | | - | | - | + | | | | | | | | | | | | | | | | | | | | | | | | | | |

*Note* 1. + = only positive remarks on that element; - = only negative remarks on that element; o = neutral remarks, or remarks were both positive and negative; blank = no remarks.
*Note* 2. All three subject groups (BA, IC, RM) discussed their own selection of OERs. See Appendix B for an overview of all OERs discussed in this study

Table 3.3
*Excerpt of a conversation on content (subject RM)*

| | |
|---|---|
| Terry | I was filling in a test on the first chapter. I can't even find it that easily right now. About research questions and how you can delineate the scope a bit. And yes, I see several things that me think 'gosh'. The topic 'Andy Warhol', I don't even know who it is, but I have to say something about him apparently. |
| Melissa | What they do is describe the feeling a student has of 'help where do I start'. They want to evoke that and then show you how to do it. |
| Terry | But then it doesn't help that there are so many unfamiliar things in the examples [they use]. So that you already have a lot of…. |
| Melissa | Moments to drop out. |
| Terry | Actually, yes, yes. |
| Rosa | Well, I don't know. I think it's realistic for students. We as teachers already know a lot, but students have more of a blank mind. |
| Terry | Yes, certainly. On the other hand, if you follow up on things they should know, it does have a greater effect than taking an example like, uhhm. If you start mentioning Andy Warhol you probably should not then also mention Mozart. |
| Rosa | An example that may be more relevant to them. |
| Terry | Yes. |
| Melissa | I think that if you are given examples that are outside your frame of reference, you may get a better understanding of the steps than if you identify with the example […]. |
| Terry | Agree, agree. But I can also imagine that you create the exercises in such a way that you start with things that are familiar and then slowly but surely make the exercises more complex by moving it further away from their world. |
| Amy | With this condition you can never make an OER if the examples have to fit all contexts. That is impossible to do. |

In this excerpt the discussion is started by Terry, who debates the use of unfamiliar examples which may make students drop out. Melissa and Rosa, however, do not agree with this, while Amy emphasizes the impossibility to design an OER that aligns with all contexts.

*Theme 2: Design*

The second theme refers to (2) the design of the resource. It was especially the *pedagogical design* (2a) of the resource that was frequently discussed by teachers in both IC and RM. Jake (IC), for example, decided that OER1 had a sound pedagogical design because the resource was developed in collaboration with a curriculum committee. Joe and Kyle (BA), on the other hand, decided that the last two resources were less suitable for them as they did not fit their problem-based learning approach. Stephanie (IC) also had a similar motive to discard a resource [OER2]: 'I think cultural awareness, like we teach it, is more of an experience module. You encourage students to reflect upon themselves. [...] We want to make [the student] aware, search for information and bring this to the classroom, where we will have the dialogue. Culture is determined together. Such an open textbook is only interesting for a small number of students who may learn something from it [...].' Most teachers also examined the *granularity* (2b) of a resource, in other

words, if a resource consisted of separate chunks that enabled them to easily select those elements needed to enrich their education for time- and place-independent learning. Other elements that were examined related to the *looks* (2c) of the resource, and whether it consisted of a mix of l*earning modalities* (2d). For example, teachers valued resources that looked attractive and made use of a combination of reading, videos, and exercises, because this motivates their students. A few teachers made comments about the *developer* (2e) and the *production date (2f)* of the resource.

An excerpt of teachers' comments with regards to the design elements is provided in Table 3.4. This excerpt shows that teachers assessed the design of the resource, and that because the resource is open they have the option to adapt it to fit their own context.

**Table 3.4**

*Excerpt of a conversation on design (subject RM)*

| | |
|---|---|
| Melissa | I already sent it to some colleagues. Yes, this resource is much better than a standard SPSS manual. And what Rosa said, you can adapt the resource and delete everything you do not want. I think this is a great resource for a lot of colleagues, if you teach in English. You can select what is relevant. Especially because it is so complete, so exhaustive, it can be used at several [schools]. |
| Rosa | I already said it, but I think this is one of the best resources. It is really well designed. I think the content is really good, it is didactically sound, they really thought it through. |

*Theme 3: Usability*

The third theme derived from teachers' conversations is related to (3) usability. Three elements, *layout* (3a), *navigation* (3b) *and utility* (3c) were often evaluated from a student perspective. Kyle, for example, illustrates this [OER2]: 'I'm also assessing it from a student perspective. There isn't a lot [of text] on a page which is something I always like, too. Plus, there are a lot of good exercises and examples and it's very clear how you progress in the course. How many topics do you still have to do? Another thing that I thought was very neat was a notepad function in which you can take notes which you can access later on. I find that very useful. Also, on every page you have those tips on how to use the navigation buttons, what you have to do, save your work, that sort of thing. Especially when it comes to user-friendliness I really liked this one.'

Whereas teachers' conversations on these three elements focus on how easy it is for students to learn, use, and navigate the OER, *access* (3d) to the resource was mainly assessed from a teacher perspective. Although most resources were easily accessible, others required a login to access the resource for the first time. This led not only to confusion among teachers about the openness of the resource, but also to negative assessments because it proved too much of a hurdle. Another issue experienced by teachers was the possibility, or lack of it, to gain *insights into students' progress* (3e) in the resource. Since the resources enable teachers to 'flip the classroom', teachers stressed the need to have insights

into students' progress and results in order to attune their teaching to students' needs. In Table 3.5 an excerpt is given in which teachers of the IC group express their concerns regarding this issue.

Table 3.5
*Excerpt of a conversation on usability (subject IC)*

| | |
|---|---|
| Jake | The only remark I have for myself is that if you give this [to your students] and they're going to explore it, how do you know what they do and how they interpret the material? If I give them one method, I can analyse if they studied it properly. Whereas […], if I give them the freedom [to explore the OER], then you are limited in analysing if they understand it, if they have done something, if they have cited sources [in their assignments]. But it is very difficult [as a teacher] to control it all and to gain insights into students' learning. Do you get what I mean? |
| Moderator | Yes, so… |
| Jake | It's more like 'here you have an OER, do it yourself' versus 'what is my expertise as a teacher still needed for'. [...] How in-depth do you have to analyse what students are learning. I don't think that should be a problem. In the end, a master-apprentice relationship will emerge in which specific experience and knowledge can always be coached [by the teacher]. A subject like communication lends itself for it as well. |
| Andy | [...] I'm just looking at how I'm going to use this. Are you going to say to students 'here is the module, here is the textbook, here are the videos' or am I going to offer it integrated [into the curriculum]. I prefer to have it all together, like here is a part of communication to discuss and this part of the theory goes with it, together with a few good videos. Now it looks to me like a publisher's website or something. Book, videos and good luck with it. |

Here, usability is examined from a teacher perspective as assessment of learning gains, and the teacher-student relation is an issue for teachers. Andy, for example, shows that he does not know how to make use of the resources, and Jake is also concerned about how his role as a teacher may change due to the use of this OER.

*Theme 4: Engagement*

The fourth theme to be discerned from teachers' conversations relates to (4) students' engagement with the resources. Teachers valued the *exercises* (4a) and the availability of *videos* (4b). Initially, teachers from both BA and IC positively valued the videos, as these engage students and are time-consuming for the teachers to create by themselves, but after a first glimpse teachers stated that the videos were either too slow or not attractive to watch. The *feedback on exercises* (4c) *and interactivity* (4d) in the resources, as elements stimulating student learning, were assessed as well. In Table 3.6 an excerpt of a conversation is provided in which teachers of BA discuss the engagement with a particular resource. Here the teachers describe the prospective student engagement with the resource. They value the exercises, the interactivity and the option to use hints to help students learn. Some teachers stressed that the number of exercises in some

resources was insufficient and the feedback provided could be more specific, although they were aware that they may be nit-picking. If they used that OER, they would either increase the number of exercises to slow learning pace, or add the context of students' future profession. Another element, mentioned by some teachers, is the need for a *progress bar* (4e) in which students can see how they advance through the resource. However, not all teachers agreed with this. Amy (RM), for example, stressed that a progress bar implies a given chronological order, whereas students may only need to study parts of an OER.

**Table 3.6**

*Excerpt of a conversation on engagement (subject BA)*

| | |
|---|---|
| Ray | In the first OER you're just making exercises with a calculator on the side and then enter the answers online. But in this other one, interactivity is also embedded. You still need the calculator on the side, but you can also do some things online. |
| Joe | You're really staying awake with this resource. I did a part on testing and there was a section on p values and significance levels. You got a text in which you had to drag and drop the constructs in their correct box. You really had to understand the concepts. It was an excellent exercise. |
| Kyle | Yes. |
| Joe | And if it was wrong, you could check the answers. Yes, it was really well designed. |
| Kyle | And the hints. You can also make the exercises without seeing the correct answers, and if you don't know the answers you can click on hint. And yeah, I really liked that, because they are really pushing you in the direction of the correct answer. |

*Theme 5: Readability*

The fifth theme in teachers' considerations was (5) the readability of the resource. For a few teachers this applied especially to the *language* (5a) of the resource, when English was a second language for them and their students. In those cases, the English language either resulted in a negative assessment or in a limited uptake, as teachers would only use that OER as an additional optional resource. Nevertheless, this was also the issue teachers disagreed upon most. Several teachers believed that students should be able to use English resources, because they will work with English resources and terminology in their future professions. The *level of the language* (5b) is closely related to this issue. Even though some teachers had no problem with English itself, the level was perceived as too academic. Other elements that teachers assessed related to the *style of writing* (5c) and the *length of the text* (5d). Teachers agreed that texts must be short and to the point if they are to engage students. In Table 3.7 an excerpt of a discussion is provided in which some teachers' reasoning on readability is illustrated.

Table 3.7
*Excerpt of a conversation on readability (subject RM)*

| | |
|---|---|
| Terry | English is taboo. |
| Amy | Taboo even? I mainly teach international students, so yes, it is something I don't pay much attention to. For my Dutch students it will be a stumbling block, but it's not a no-go area for us. |
| Rosa | I noticed, there was another resource that had it too. As it is academic English, it is difficult for our students. Most international students, at least in our school, are non-native [English] speakers. […] And although we do want them to be able to speak English, it may well be that this is too ambitious. |
| Terry | They are as proficient in English as they are in Dutch, that means, they are not [proficient]. |
| Amy | Do they have to use academic resources? |
| Melissa | But did you think that for this resource as well? It was such an effective, colloquial text. It was really like 'I am sitting behind my laptop and owww.. what am I supposed to do?' |

This excerpt shows that readability is an issue regarding both the language of the resource and the level of the language. Terry will not use English resources; his colleagues do not necessarily mind the language itself, but will check whether the level of the language is appropriate for their students.

## Teachers' perceptions of OER

In addition, we explored if teachers' perceptions of OER had changed during the course of three months in which teachers could explore the concept. Issues on the adoption of OER often revolve around teachers' lack of awareness, or being more critical of OER than of traditional resources. On the basis of the association maps and the concluding individual interviews we explored if interaction with OER had led to changes in teachers' perceptions.

### *Associations with OER*

Three main themes emerged from our comparisons of pre and post association maps and the final interviews:

1. A*wareness* regarding OER changed from a limited or shallow understanding to an increased understanding of its defining characteristics and the licensing mechanisms.
2. Teachers' *attitude* changed from doubtful preconceptions regarding quality to appreciation of the value OER could have for their lessons due to the perceived quality of the resources, although fitness for purpose remains an issue.
3. Although *practical issues* were a concern in both pre maps and post maps, there was a change from uncertainty and questions around practical issues involved in using OER, to an understanding of the actual implications of these issues due to their experience with OER.

Theme 1: Awareness

The theme of 'awareness' illustrates the changes in teachers' understanding of OER. Chelsea's pre and post maps (IC, Figures 3.3 and 3.4) illustrate an increased awareness regarding '5R' characteristics and license mechanisms.

Figure 3.3

*Pre map: Chelsea (IC)*

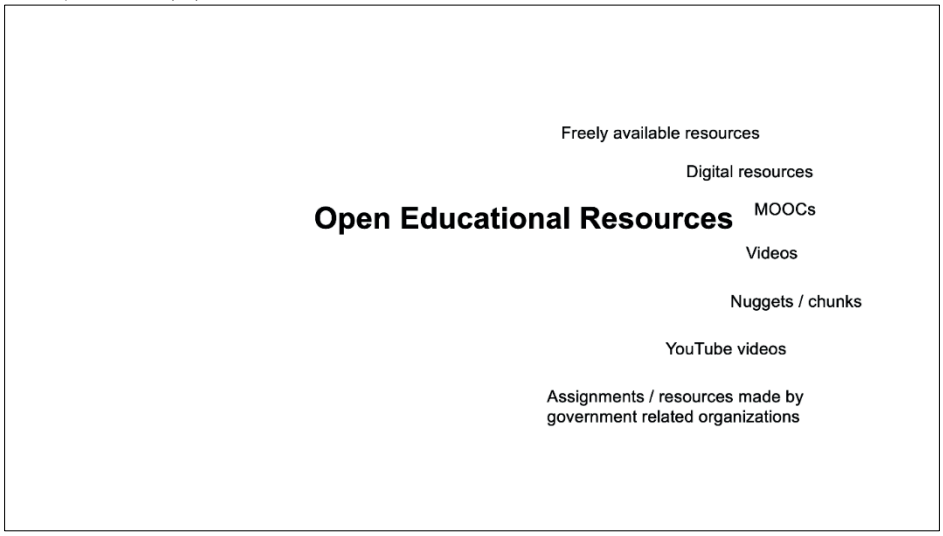
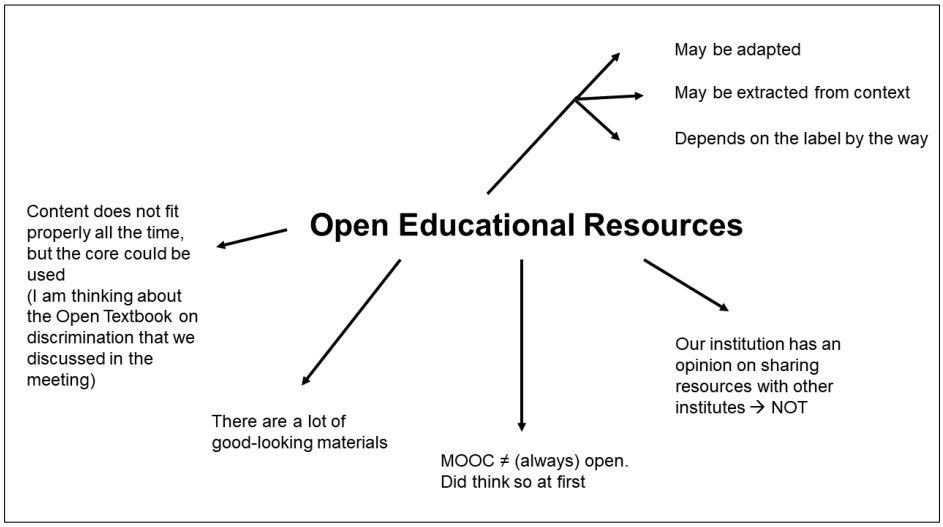



Figure 3.4

*Post map: Chelsea (IC)*



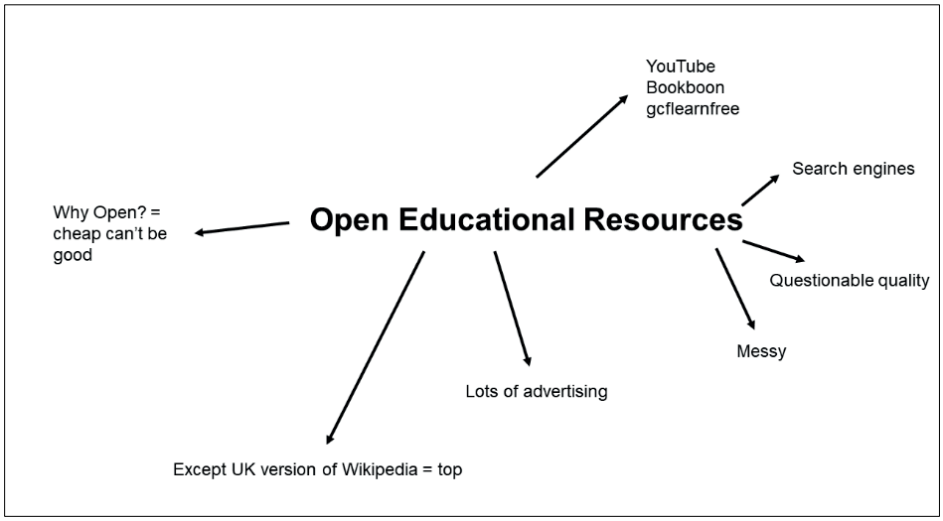
Whereas their associations in the pre maps primarily focused on the open-access aspect of OER, in the post maps associations were extended to other '5R' characteristics. Most teachers now had a clearer understanding of how OERs differ from traditional resources (e.g. options for revision and retaining) and how OERs could be licensed (e.g. Creative Commons).

Theme 2: Attitude

The theme 'attitude' is about teachers' concerns regarding the quality and fitness for purpose of OER. Teachers seemed unsure about the quality of OER, and wondered whether resources would have a sound pedagogical design and would fit their own learning objectives and context. Associations in the post map indicated that 'big' OERs have changed teachers' opinions about the quality of OER as they shifted from a more critical towards a more positive attitude. Nonetheless, in their post maps teachers stressed that fitness for purpose remains an issue. The differences between Joe's pre and post maps (BA, Figure 3.5 and 3.6) illustrate this.

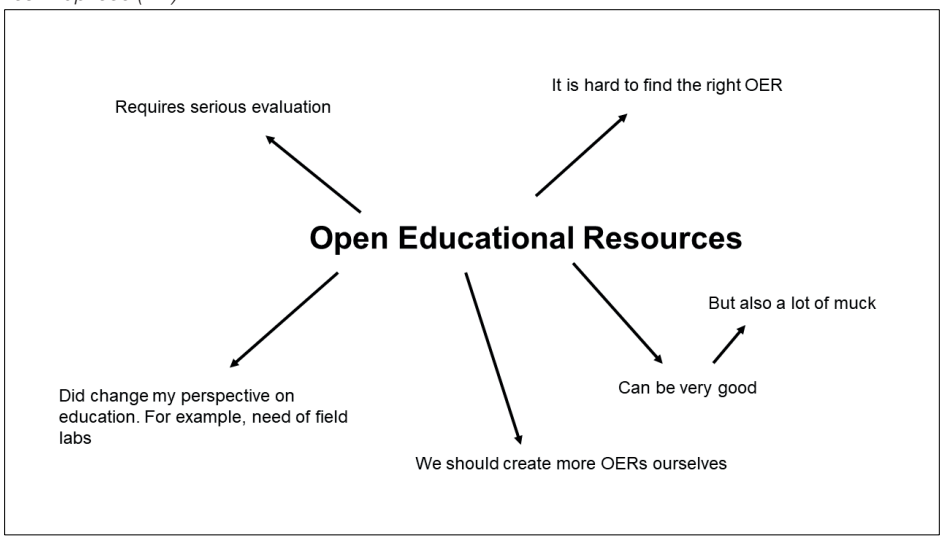
Figure 3.5

*Pre map: Joe (BA)*




Whereas in the pre map Joe had associations related to 'questionable quality' and stated 'cheap can't be good', his associations in the post map changed to 'we should create more OERs ourselves' and 'requires serious evaluation'. And although he still thinks there are many resources of questionable quality, he changed his attitude to 'OER can be very good'.

Figure 3.6
*Post map: Joe (BA)*




Theme 3: Practical issues

In the post maps the main concern regarding OER shifted to practical issues. In the pre maps teachers predominantly questioned whether it could offer them efficiency, if it would fit their curriculum, and whether it could provide them with opportunities to change the course design (e.g. with their function changing from teacher to guide). In the post maps, associations shifted from uncertainty to understanding the actual implications of practical issues that could arise from using OER. The efforts to determine the fitness for purpose, to adapt resources to their own context, and the English language were frequently cited. Although the '5R' characteristics enable teachers to adapt resources so as to overcome some of these issues, this was not the teachers' main focus during the initial assessment of OER since adaptation requires a serious investment. Rosa's pre and post maps (RM, Figure 3.7 and 3.8) show this change in associations on these practical issues.

At first, Rosa primarily raised concerns about issues such as 'where and how to find' and 'quality'. Does the OER fit her objectives, her students, and her context? Afterwards, in the post map she answered her own concerns regarding availability, fitness for purpose, the investment required to revise and remix, and the language of the resources.

Figure 3.7
*Pre map: Rosa (RM)*

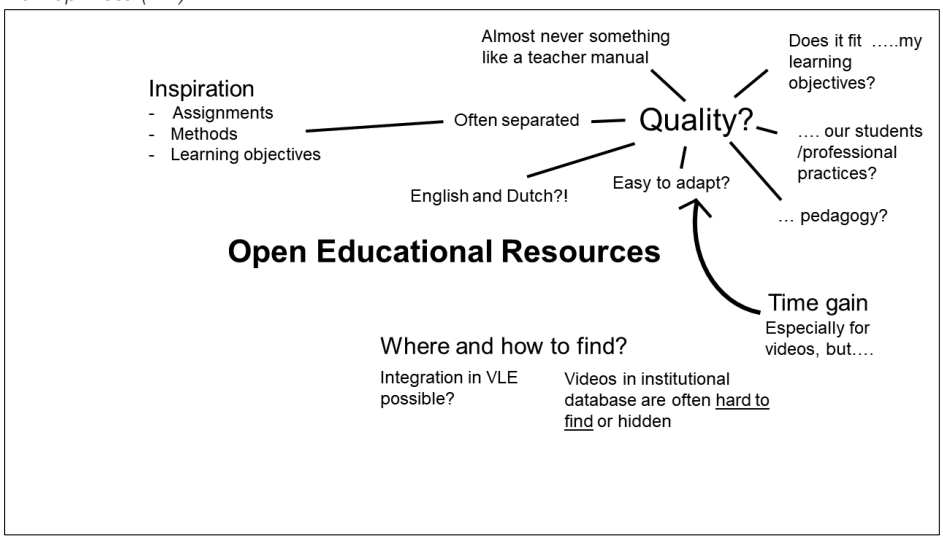
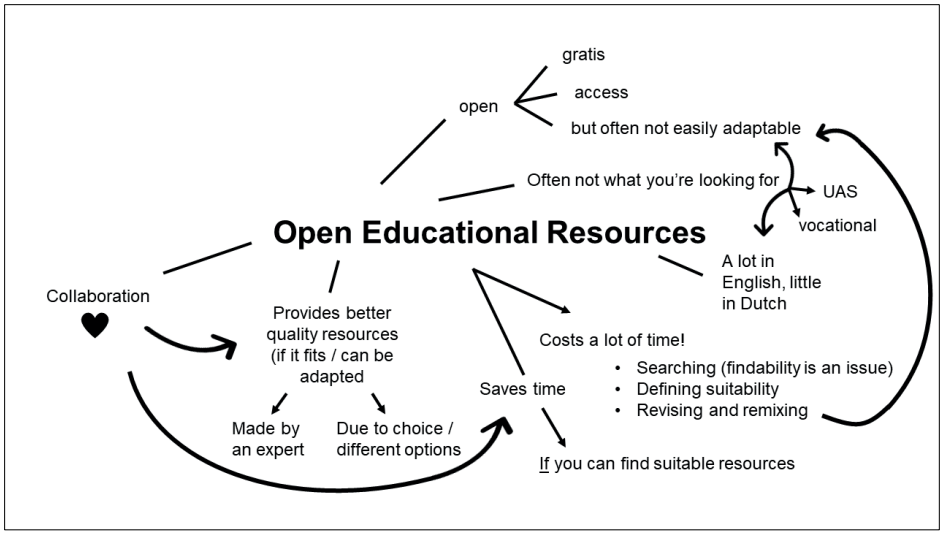



Figure 3.8
*Post map: Rosa (RM)*




*Teachers' reflections*

Overall, teachers were positive about OER and its quality. Several teachers even stressed that some OERs should be made compulsory for their institute because they matched or exceeded commercial learning resources. However, most teachers mentioned that in order to be able to adopt the resources it is necessary to refer to the defining '5R' characteristics to improve readability, to add the context

of students' future professions, or to select relevant parts and mix these with their other resources. A few teachers especially valued the 'retain' characteristic; this offers a continuity assurance because they can download resources, although practical issues such as how to manage updates and version control were a concern.

Although teachers were positive about OER, and some of them shared resources with their colleagues, only three teachers actually adopted resources during the four months of this study. These teachers mostly used OER as additional optional resources, because they found it challenging to integrate OER in ongoing courses. A major challenge experienced by all teachers was that it required much effort and time to fit OER to their needs as well as to redesign their courses to fit OER; time they do not always have. For example, Ray (BA) mentioned that changing the current course textbook with an open textbook would require an entire redesign of the course, because the current structure was dependent on the textbook. This was corroborated by Terry (RM) who stated that he had no reasons to change the course design, but that this is essential to effectively adopt OER. In addition to this, Amy (RM) specifically stressed that suddenly changing the course to adopt OER could confuse students. How to actually use OER was an impediment for adoption as well, because several teachers mentioned that they needed more information about how to use the OER in their teaching. For example, Chelsea (IC) and Rosa (RM), specifically brought-up the need of teacher manuals. Another challenge related to a sense of control, because some teachers mentioned that if they would use an OER, they would have limited insights into students' use and engagement with it.

Hence, due to these challenges, several teachers mentioned that they would like to adopt OER in the future when (re)designing a course, so as to enrich the design of their course with time- and place-independent learning. Teachers therefore strongly recommended focusing on OER during curriculum reforms.

Discussing OER with colleagues was a positive experience for all teachers, because it offered them the opportunity to share and discuss their practices, to gain insights into colleagues' assessment criteria, and to come into contact with teachers who have a similar teaching style. Ray (BA), for example, explained that his own school applies a traditional way of teaching. He therefore liked being able to discuss OER with teachers that share his teaching style. Terry (RM) commented that for him this meeting was also a moment of reflection because he noted that other colleagues continuously update their courses, while he does not. This made him wonder why he was using an unchanged course design each year. Melissa (RM), on the other hand, stated that the meeting had changed how she assessed OER. She learned not only to assess resources in their entirety, but also to value parts of them. Although all teachers thought the plenary meetings were valuable, they also thought that it would be even more beneficial to assess OER with colleagues of their own team.

## DISCUSSION AND CONCLUSION

The aim of this descriptive qualitative study was to (1) increase our understanding of the elements teachers take into account when assessing 'big' OERs, and (2) analyse whether teachers' perceptions of OER changed due to their interaction with it. We used a qualitative research design, because previous studies mainly focused on quantitative designs in which the qualitative process of evaluation of OER by teachers was not taken into account. The findings provided us with in-depth evidence-based insights into teachers' assessments and perceptions of OER. In this section we will discuss the theoretical and practical implications that follow from our findings.

### Teachers' quality assessments

The first research questions focused on characterizing how teachers assessed the quality of OER. Our findings revealed five themes covering the range of elements that teachers mentioned in their assessments of the 'big' OERs. The first theme related to the *content* of the resource. Teachers assessed it on relevance, correctness, structure and whether it fit the context of students' future professions. The second theme related to the *design* of the resource. Teachers examined both the quality of the pedagogical design and whether it matched their teaching approach. Additionally, they thought OER should be attractive and offer a mix of learning modalities. The third theme, *usability,* referred to the way teachers assessed OER on layout, ease of navigation and utility from a student perspective, whereas ease of access and gaining insights into students' progress was valued from a teacher perspective. The fourth theme, *engagement,* related to the value teachers assign to opportunities for students to interact with the resource, through exercises with feedback mechanisms and similar interactive features. The last theme referred to the *readability* of the resource. OERs should have texts that are concise, to the point and not too academic. The latter is especially the case for resources that are not in students' native language.

This study has provided us with an in-depth account of teachers' collaborative dialogue about the quality of OER. It illustrates the elements teachers take into account when assessing OER without a given rubric to guide them. If we compare these findings with the generic OER rubrics as presented by Yuan and Recker (2015), both similarities and differences can be identified. Similarities can be found in the views on content, pedagogical design, usability, and engagement with OER. One specific finding regarding content is that teachers stressed the importance of the relevance to students' future professions. It is important to note that this may differ for different educational levels. Universities of applied sciences prepare students to work in a specific vocational domain, and these findings may be less relevant for other levels of higher education.

Three differences were distinguished. A remarkable difference relates to the accessibility of OERs. Accessibility is mentioned in several rubrics (Achieve, 2011; Haughey & Muirhead, 2005; Leacock & Nesbit, 2007), but the teachers in our study made no remarks about it. It is, however, important to address

accessibility and universal design for learning, so that resources may be used by all learners, with and without disabilities (Moon & Park, 2021). Another difference between existing rubrics and our findings relates to the legal and technical criteria for OER (Jung et al., 2015; Leacock & Nesbit, 2007; Kurilovas et al., 2011). In our study only few statements related to this topic, but this could be due to the fact that teachers knew that all resources were open and that support on technical aspects was available. Another difference can be found regarding the theme of readability, which is not explicitly mentioned in other rubrics except in Kurilovas et al. (2011). This could be explained by the context because all studies, except ours and Kurilovas's, were set in an English-speaking country. Readability appears to be a topic of dispute for teachers in countries where English is not students' native language (Rets et al., 2023).

### Teachers' perceptions of OER

Because most studies on OER perception only measure teachers' perceptions before or after using OER, the additional value of the current study was that we explored teachers' perceptions of OER both before and after their interaction with the resources. Three changes were identified from teachers' pre and post association maps. (1) Teachers' awareness changed from a limited or shallow understanding of OER characteristics and license mechanisms to increased insight. (2) Teachers' attitudes changed from doubtful preconceptions regarding the quality of OER to an appreciation of OER as probably useful for their teaching. Overall, teachers were impressed by the quality of the OERs provided, albeit fitness for purpose remained an issue. Indeed, (3) practical issues regarding using OER continued to be a concern, but a change did occur in teachers' perceptions. Their attitudes changed from being doubtful and unsure of practical issues of using OER in the pre maps, to an understanding of the significance and implications of these issues in the post maps. These practical issues related to a limited fit for purpose, the difficulty of adopting OER in ongoing courses, and readability. Although the '5R' characteristics allow teachers to adapt OER and so overcome these issues, teachers primarily assessed whether the resources could directly fit their own context. Yet, we believe that flaws and an imperfect curricular alignment of OER should not prevent teachers from adopting them, because traditional resources are often equally imperfect (Belikov & McLure, 2020; Watson et al., 2017).

In the end, teachers valued the potential of OER for enriching the design of their course with time- and place-independent learning, which is in line with the findings of Schophuizen et al. (2018). However, they did find the integration of OER in ongoing courses difficult, which resulted in limited adoption. Even though the value of OER can also lie in finding inspiration (Pulker & Kukulska-Hulme, 2020), it is important to support teachers in actually adopting OER because it can foster students' learning and promote a culture of openness (Luo et al., 2020).

## Practical implications

Based on our findings, a number of practical implications are identified relating to collaborative dialogue, instructional designers and librarians, and tools that could support teachers in assessing OER.

Teachers are the main agents of OER adoption, and on the basis of our findings we have formulated three practical implications. First, teachers' pre maps indicated that awareness regarding OER is still limited, which is in line with findings from prior research (e.g. Cox & Trotter, 2017). The findings of our study make a compelling case for collaborative dialogue as an important method to foster awareness about OER. The collaborative dialogues show that the conversations had an impact on teachers' assessment of the quality of OER: when teachers observed their peers' assessment criteria, they could adapt their perceptions of OER. Second, we recommend organizing these collaborative dialogues within teachers' own teams so that the assessment of OER and the discussions about whether to adopt it are already attuned to their specific teaching contexts. Third, adoption of OER still remained a challenge due to the difficulties experienced in implementing OER in ongoing courses. Therefore, we endorse the recommendation by Schuwer and Janssen (2018) to focus on OER adoption during curriculum reforms. During such reforms it is important to stress the '5R' characteristics as resources may be adapted to fit both the design and the delivery of courses (Armellini & Nie, 2013).

Yet, teachers were uncertain about revising OER. It is important to stress that in order to select, adapt, or develop resources, teachers need both content knowledge and pedagogical content knowledge (Koehler et al., 2007). Previous studies illustrated that this knowledge can be enhanced during collaborative curriculum design (Voogt et al., 2011), especially if just-in-time support is provided (cf., Huizinga, 2014; Huizinga & Van Hamelen, 2021). It is important to be aware that teachers can only master the processes of localizing and personalizing resources through experience (Hood, 2018). We therefore recommend to provide teachers with opportunities and support to gain experience with utilizing content knowledge and pedagogical content knowledge to select, adapt, or develop OER. Institutes should extend the roles and responsibilities of instructional designers to support teachers during such curriculum reforms (cf., George & Casey, 2020; Ren, 2019). In addition, curriculum reforms are mostly organized with teacher design teams (cf., Huizinga, 2014), but it appears that librarians often are not included in these teams. Yet, prior research has indicated that librarians are indispensable for OER as they can provide answers and support regarding open licenses, adapting, and using OER (e.g. De Jong et al., 2019; Katz, 2020; Reed & Jahre, 2019). Thus, faculty could receive institutional support from librarians and instructional designers regarding OERs during curriculum reforms.

Finally, there is a range of tools available to teachers to assess OER quality. As stated in the Introduction, we have defined quality from an individual point of view and finding 'the perfect OER' is a personal quest. Indeed, the teachers' comments on OER within this study show the variety in quality. Teachers are

perfectly capable of determining what pedagogical and didactical elements they deem necessary, but available tools could support teachers in assessing OERs on elements of quality that they may not automatically take into account such as open licenses, accessibility of OER for all learners, ramifications of the technical formats for teaching with OERs, and the possibility to revise and remix resources to teachers' own contexts. Examples of such tools are the Accessibility Toolkit (Coolidge et al., 2018), the Open Attribution Builder (Open Washington SBCTC, n.d.), and the guide Modifying an Open Textbook: What You Need to Know (Cuillier et al., 2016). Teacher teams or teacher communities could also decide to develop their own quality model with the aid of the Toolkit Quality Assurance of OER (SURF, n.d.).

## Limitations and future research

This study has limitations that must be acknowledged. First, although resources were selected on the basis of the topics provided by teachers, the focus of and emphasis on these topics may differ between schools and contexts. For this reason, teachers may have had to assess resources that were less relevant to them. We therefore suggest that future research should focus on teacher teams or professional teacher communities. This may improve the fit of content to user context, which could impact the assessment of quality (Cox & Trotter, 2017; Kelty et al., 2008). Second, this study focused only on 'big' OERs, whereas there is a vast number of 'little' OERs available. It must be acknowledged that the size of the OERs may have influenced teachers' assessments. It would therefore be valuable to explore if there are differences in perceived quality between 'big' and 'little' OERs. Third, we did not examine whether demographical features influenced teachers' assessments. It would be interesting to further explore differences in perceptions of quality between experts and novices (Abrahamovic & Schunn, 2012; Hood, 2018), as well as to explore students' perspectives on OER quality (Schuwer et al., 2021).

## Concluding remarks

In this study we aimed to gain a better understanding of teachers' assessments of OER. We found that the core themes of teachers' assessment were related to (1) content, (2) design, (3) usability, (4), engagement and (5) readability of OERs, and secondly that teachers' perceptions of OER changed to an increased awareness and a positive attitude towards OER, while practical issues changed from concerns and uncertainties to insights into the implications of using OER. On the basis of our findings we recommend that higher education institutes aiming to increase OER adoption should encourage conversation on OER in teacher teams during curriculum reforms. Due to the experienced difficulties of adopting OER in ongoing courses, curriculum reforms are the contexts in which OER adoption could be achieved in both the design and the delivery of courses. Since the context of resources appeared to be an issue for teachers, it is important that teachers are supported to adapt resources to their instructional needs and teaching contexts. This issue may be wholly or partially solved through the use of professional

communities in which teachers share and use resources already made within a specific context. Such communities are currently in development in the Netherlands funded and supported by the Dutch government. To improve our understanding, more research on perceived OER quality, teacher communities, and OER adoption is needed.

# 4

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

This chapter is based on:
Baas, M., Schuwer, R., Van den Berg, E., Huizinga, T., Van der Rijst, R., & Admiraal, W. (2023). The role of brokers in cultivating an inter-institutional community around open educational resources in higher education. *Higher Education, 85*, 999-1019. https://doi.org/10.1007/s10734-022-00876-y

ABSTRACT. Brokers are individuals who facilitate transfer of knowledge and resources, and coordinate efforts across boundaries of organizations. They are defined by their role rather than their organizational position. Brokers might be imperative for the formation and maintenance of inter-institutional relationship as they have the responsibility and the necessary structural position to connect otherwise separate groups. In the context of this study, brokers had the role to cultivate an inter-institutional community around Open Educational Resources (OER) by connecting groups of teachers across higher education institutes. OER provide higher education institutes with an aid to face the challenges of improving teaching and learning. Yet most OER users encounter challenges that relate to finding resources that are relevant, up-to-date and of good quality. Communities or networks of users could minimize this issue, but many OER initiatives fizzle out as expanding their impact is an arduous task. This qualitative descriptive study draws upon Cultural-Historical Activity Theory to understand the complexities associated with the role of brokers in creating sustainable collaboration on OER across 15 higher education institutes in the Netherlands. Data was collected from project documents, process reports, reflections reports and a retrospective focus group. The findings show that brokers engaged in a wide variety of actions but 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. Brokers also experienced conflicts due to the demanding context they were operating in, the ambiguity of their role and the organizational constraints they were confronted with. Practical implications refer to supporting higher education institutes that wish to initiate sustainable collaboration across institutes.

## INTRODUCTION

The number of Open Educational Resources (OER) available in online repositories is ever-growing. Due to their unique characteristics, teachers may retain, reuse, revise, remix and redistribute these resources (Wiley, 2014) allowing them to adapt OER to their teaching needs (Belikov & Bodily, 2016). OER could support initiatives to improve teaching and learning (Orr et al., 2015), for example by improving access to student learning by reducing costs (Hilton et al., 2014), improving teachers' critical reflection on their practices (Weller et al., 2015) or increasing collaboration between teachers across institutes (Chae & Jenkins, 2015). Despite the potential of OER and the vast number of these resources available, adoption remains limited (Schuwer & Janssen, 2018). Several barriers have impeded adoption (Cox & Trotter, 2017) but a major problem for most OER users relates to finding resources that are relevant, up-to-date and of good quality (Admiraal, 2022). Some researchers suggest that communities could minimize this issue (Baas et al., 2019; Clements & Pawlowski, 2012; Orr et al., 2015). Nonetheless, keeping activities using OER sustainable over a long period of time is essential for impacting teaching practice, yet most OER initiatives cease to exist after the initial project funding due to challenges relating to increasing the size of the user group and central control of OER quality (Orr et al., 2015). Growing a small community of volunteers into a broader audience is arduous as it requires continuous collaboration across institutes to increase the size of the user group, despite the sociocultural differences that may exist between them (Akkerman & Bakker, 2011). Coordinators play an important role in this critical aspect of cultivating the user group, especially within distributed communities in which ties need to be established to connect several local groups into one community (Wenger et al., 2002). Brokers is a term often used to denote these coordinators who act as a bridge between sites such as across higher education institutes (Akkerman & Bakker, 2011). For example, in inter-institutional collaboration, sociocultural differences between institutes need to be overcome to avoid discontinuity of interaction in the longer term. It are brokers, who are individuals working within the institutes, that take up the role to facilitate boundary crossing by introducing elements of one practice into another. Brokers have a valuable yet difficult role with regard to spanning boundaries, yet limited knowledge is available to understand the particular complexities associated with the role of brokers in creating sustainable collaboration across institutes in higher education. Thus, the aim of this descriptive qualitative study was to contribute insights into the role of brokers in cultivating an inter-institutional community around OER.

## THEORETICAL FRAMEWORK

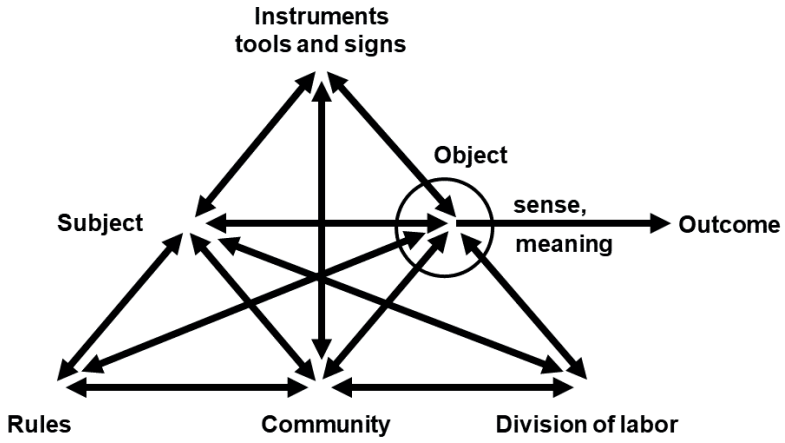
### Boundary spanning and the role of the broker

Although some great examples of sustainable OER communities do exist (e.g. MERLOT, OER Commons), studies on cultivating such communities are scarce. Even though a number of studies have described the design and outcomes of inter-institutional communities around OER (Borthwick & Dickens, 2013; Burgos-Aguilar & Mortera-Gutierrez, 2013; Tosato & Bodi, 2011) they do not provide any information about the persons spanning the boundaries between institutes to cultivate the community. Boundary spanners are essential, however, to the formation and maintenance of inter-institutional relationships through which the interdependency is managed (Van Meerkerk & Edelenbos, 2018). Due to their key role, we are specifically interested in these boundary spanners who have the responsibility and the necessary structural position to connect otherwise separate groups (Akkerman & Bruining, 2016). When connecting these separate groups, boundary spanners will encounter boundaries which 'typically become visible and articulated when actors try to access something on the other side of the boundary and encounter obstacles or constraints in this quest' (Engeström & Sannino, 2021, p. 21). How do boundary spanners span these boundaries? They apply a range of activities (Van Meerkerk & Edelenbos, 2018; Williams, 2002) as they: (1) develop and maintain relationships on both a formal, and informal and personal level to connect otherwise separate groups; (2) align, coordinate and maintain activities and processes within both their own organization and the wider network; (3) mediate the information flow between organizations by both transferring information across boundaries and transforming information so that it can be understood across organizations; and (4) proactively respond to opportunities to exploit the collaboration and solve problems or to bend problems to solutions. What makes a boundary spanner successful? Besides these individual determinants that are often reported to impact boundary spanning behaviour, boundary spanners can also be facilitated and hindered in their role by other factors (Van Meerkerk & Edelenbos, 2018). The complexity and dynamics of the environmental characteristics are pertinent to boundary spanning behaviour as boundary spanners face environmental uncertainty, diversity and interdependency. Boundary spanning behaviour can also be impacted by conflicts that can arise due to issues in role definition and role stressors. Boundary spanners can encounter role conflict, role ambiguity and role overload and coping with these issues can affect their performance. Furthermore, organizational support and feedback may not only affect spanning behaviour but can also impact their satisfaction, motivation and commitment. As boundary spanners are defined by their role rather than their organizational function, conflicting demands and needs of different stakeholders may arise. Organizational support in terms of management backing them, empowering them to make certain day-to-day decisions and giving feedback on their performance, as well as the dynamics with co-workers are essential to cope with these demands and needs. Depending on the situational demands and

personal capacities, the various tasks of boundary spanners can be combined in a profile of fixer, bridger, broker or innovative entrepreneur (Van Meerkerk & Edelenbos, 2018). The focus of the current study was on individuals who facilitate cooperation across boundaries with the aim of increasing the size of the user group so that teachers across all institutes will engage with the inter-institutional community. We therefore defined boundary spanners as brokers who 'can facilitate access to novel information, or resources, facilitate transfer of knowledge, and co-ordinate effort across the network' (Long, Cunningham, & Braithwaite, 2013, p. 2).

Although these studies provide valuable insights into the role of boundary spanners, it is important to note that our understanding of boundary spanning mainly derives from organizational theory. Within the context of higher education, previous studies have mainly explored boundary spanning roles in university-industry collaboration (Corsi et al., 2021; Martin & Ibbotson, 2021; Oonk et al., 2020), within transnational partnerships (Bordogna, 2019) and university-school partnerships (Akkerman & Bruining, 2016; Nguyen, 2020), as well as the role of leaders as boundary spanners (Prysor & Henley, 2018), but little is known about boundary spanners within inter-institutional collaborations. Hill (2020) examined boundary spanning behaviour of brokers intended to connect their campus with the wider network of institutes, but the focus of these brokers was on exploring and transferring the value of the network to their own campus. In the current study, the focus of the brokers was on expanding participation in inter-institutional communities in higher education, a topic on which Hill suggested further research is needed. Thus, to gain a better understanding of brokers' spanning behaviour, we will explore the actions and perceived impact of brokers' boundary spanning within the social setting of an inter-institutional community using OER. As the brokers were fulfilling a role within a complex social setting, we used cultural-historical activity theory (CHAT) as a valuable framework, given that goal-directed actions can only be interpreted within the background of the entire activity system (cf., Engeström, 2001). We therefore drew upon the second generation of CHAT as it enabled us to focus on the complex interrelations between the brokers as a subject and the collective activity (Engeström, 2001). Engeström (1987) presented a general model of an activity system (Figure 4.1) which provides a framework for exploring the relationships and transformations between different elements of the activity system from the perspective of a subject, which in our case was the broker. The object is directed at the activity and can be transformed into an outcome through the use of instruments. This process is controlled through sociocultural factors relating to the rules, community and division of labour in the activity system. The oval in the figure indicates *that* 'object-oriented actions are always, explicitly or implicitly, characterized by ambiguity, surprise, interpretation, sense making, and potential for change' (Engeström, 2001, p. 134). The object of any activity is always internally contradictory and these internal contradictions 'find their outward expressions in external ones' (Engeström, 2015, p. 70).

Figure 4.1
*General model of an activity system (Engeström, 1987, p. 78)*




## Contradictions as a driving force for transformation

Contradictions are defined by Engeström as 'historically accumulating structural tensions within and between activity systems' (2001, p. 137) and are needed for an activity system to develop. Articulating and overcoming contradictions may catalyse change, whereas unresolved contradictions can obstruct the development of the activity system. Engeström (1987) discerned four levels of contradictions: primary, secondary, tertiary, and quaternary. Primary contradictions appear *within* any of the nodes, for example within rules or within instruments, whereas secondary contradictions occur when there is tension *between* nodes within a single activity system. Tertiary contradictions happen when a newly established mode of the activity system clashes with remnants of the previous mode of activity while quaternary contradictions take place when the main activity system clashes with a neighbouring activity system. Based on Cox's (2016) research on higher education teachers' contribution or non-contribution of OER to an institutional repository, we provide some examples of contradictions on each of these four levels in Table 4.1.

Contradictions are not directly observably nor directly accessible in empirical data (Harvey & Nilsson, 2022; Kaatrakoski et al., 2017) but can be found through manifestations (Engeström & Sannino, 2011). Nevertheless, it is important to distinguish between conflict experiences and developmentally significant contradictions as 'the first are situated at the level of short-time action, the second are situated at the level of activity and inter-activity, and have a much longer life cycle.' (Engeström & Sannino, 2010, p. 7). Within the context of this study, we explicitly focused on the experiences of the brokers on the action level. The focus was therefore on the conflict experiences rather than contradictions, although these conflict experiences might indicate possible contradictions.

**Table 4.1**
Examples of contradictions within an OER context as observed by Cox (2016)

| Level | Contradiction | Example of Cox (2016) |
|---|---|---|
| Primary | Appear within nodes | Within the node Division of Labour teachers, especially those who did not contribute OER, considered teaching in the classroom as their most important role and sharing resources was seen as additional work. |
| Secondary | Appear between nodes | A key contradiction appeared between the nodes Object and Rules as teachers were concerned about the possibility that poor quality resources might negatively reflect upon the institute but no guidelines on the quality of resources were provided. |
| Tertiary | Appear between an old and a more advanced activity system | Teachers experienced a clash between the old system of having resources available to only the students in the classroom to the new system in which resources are open to all. |
| Quaternary | Appear between the main and a neighbouring activity system | Teachers experienced a contradiction with the neighbouring activity system of doing research besides the new main system in which they had to spend extra time on preparing quality OER to share in the repository. |

## This study

Within the domain of open education, CHAT has been applied to explore students' perspectives when co-authoring OER (Hodgkinson-Williams & Paskevicius, 2012), to understand teachers' practices with an institutional OER repository (Cox, 2016; Porter, 2013), to identify tensions that teachers encounter when learning how to use OER (Kaatrakoski et al., 2017) and to examine faculty-librarian OER partnerships (Yao, 2020). Yet no studies have examined the role of brokers in the process of cultivating an inter-institutional OER community while, as our introduction made clear, brokers are essential to spanning boundaries across sites. Hence, the focus of this descriptive qualitative study was to illuminate the role of brokers in the process of cultivating an inter-institutional community in higher education. CHAT offers a conceptual framework to analyse the role of the broker within the entire activity system and allows researchers 'to analyse the past, present and future of the activity' (Engeström and Sannino, 2021, p. 8). Since we were interested in the role of brokers in transforming the activity, the first research question aimed to depict the role of the brokers within the complex social setting they are operating in. The first research question was:

1) What is the role of brokers within the collective activity system of cultivating an inter-institutional community around OER?

The inter-institutional community was initiated to create a new practice in which institutes would collaborate sustainably. Brokers undertook several actions within the institutes so that culturally new patterns of activity could be produced. The second research related to this:

2) What actions do brokers undertake to cultivate an inter-institutional community around OER and what impact do these actions have on the activity?

The actions of the brokers were intended to transform the activity, yet 'this movement is driven by recurring disturbances and troubles' (Engeström & Sannino, 2021, p. 11). Since our focus was on the action level, our research question aimed to gain more insights into the conflict experiences rather than the contradictions that might exist within the activity systems of the institutes. Thus, our third research question was:

3) Which conflict experiences do brokers encounter in their role of fostering sustainable collaboration on OER among higher education teachers across institutes?

## METHOD

### Research context

There is a strong focus on OER within higher education at policy level in the Netherlands (OCW, 2019). In this descriptive qualitative study, we explored a project in which 15 Universities of Applied Sciences (UAS) collaborated on sharing knowledge and resources. The project was initiated with funding from a national program on open online education. Two categories of institutes can be distinguished within this 'Together Nursing' project. Seven institutes received funding for specific tasks, they will be referred to as core institutes. The remaining eight institutes did not receive funding and will be referred to as project institutes. Brokers were appointed from all 15 institutes to act as spanners between the project and the institute. Brokers took up this role alongside their regular role as teachers and, in some cases, also as health care professionals.

### Data collection

Before commencing the research, ethical clearance was given by the Research Ethics Committee of ICLON-Graduate School of Teaching at Leiden University. After gaining approval from the project manager to invite the brokers to participate voluntarily, we sent out information letters with details about the study. The first and second author were responsible for data collection. The first author was an outsider to the research context while the second author was involved with the project. A variety of data sources were used to enhance our understanding of the details of the role of the broker.

*Documents*

Documents that were created before and during the course of the project were accessible to the researchers. They consisted of the project plan, a mid-term evaluation report, quality rubrics, and minutes of meetings. A total of 38 documents were reviewed, of which 33 minutes of meetings.

*Process reports*

As part of the project, brokers were asked to complete a pre-structured process report after each period (approximately every two months). In these reports, brokers were asked to give an update on the progress of the project objectives, any issues within the institute that might impact these objectives, and to what extent the broker was satisfied regarding the familiarity with and use of the project within the institute. The project manager used these reports to monitor progress and to gain insights into issues within the institutes.

A total of 89 process reports were completed across nine periods. Table 4.2 shows the number of reports divided across both core institute and project institutes.

**Table 4.2**

*Number of process reports received by both core and project institutes*

| Period | Core institutes (n=7) | Project institutes (n=8) | Total |
|---|---|---|---|
| 1 | 3 reports | 4 reports | 7 |
| 2 | 7 reports | 8 reports | 15 |
| 3 | 7 reports | 7 reports | 14 |
| 4 | 6 reports | 6 reports | 12 |
| 5 | 1 report | 2 reports | 3 |
| 6 | 7 reports | 7 reports | 14 |
| 7 | 7 reports | 4 reports | 11 |
| 8 | 2 reports | 6 reports | 8 |
| 9 | 1 report | 4 reports | 5 |

*Focus group*

The initially planned focus group with the core brokers was cancelled last-minute due to the outbreak of Covid-19 and was replaced by an online focus group. To minimize the workload of brokers during this hectic time, they were advised that if an institute had more than one broker, it would be sufficient if one broker could participate. Brokers from all seven core institutes agreed to voluntarily participate.

The focus group concentrated on the brokers' experiences and reflections in their role as broker. After an introduction about the goal of the focus group, we posed several questions to start the conversation. For example, 'Looking back, what went well?', and 'Were there aspects that did not go as planned?'. Triggers were used if needed to encourage brokers to elaborate on their answers. To prepare the brokers for the focus group, a reflection report was distributed among the participants beforehand (see 'Reflection reports'). Table 4.3 presents the

pseudonyms of the core brokers that participated in the online focus group and whether they completed the reflection report.

Due to the necessity of holding the meeting online, information regarding data handling and the goal of the meeting was communicated beforehand. The focus group itself lasted approximately 45 min. The verbatim transcript of the focus group was sent for member check. No additions or changes were requested.

**Table 4.3**
*Demographics and pseudonyms of the participating core brokers in the focus group*

| Broker | Gender | Reflection report |
|---|---|---|
| Jack | Male | Yes |
| Sarah | Female | No |
| Chloe | Female | Partly |
| Xander | Male | Yes |
| Tony | Male | No |
| Kim | Female | Yes |
| Michelle | Female | Yes |

*Reflection reports*

Brokers completed a reflection report at the end of the project. In it they reported which actions they had carried out were (a) the most valuable and (b) the least valuable, as well as to what extent they were satisfied with the use of both (c) the OER repository and (d) the online community within their institute. As the project brokers did not meet in a focus group, they reported on two additional questions in which they were asked about (e) their experiences as a broker and (f) what is needed to achieve sustainable collaboration. Again, where an institute had more than one broker, a (collective) response was requested by one broker. A total of five (out of seven) core brokers and five (out of eight) project brokers submitted a report. No pseudonyms were given to the project brokers.

## Data analysis

The collected data were analysed in five steps. The first step focused on condensing the process reports and minutes. No data were excluded from further analysis in this step. For the process reports, close-ended questions were aggregated in tables while all open-ended questions were copied verbatim. This resulted in 15 overview documents, one for each institute, rather than 89 separate process reports. The minutes were organized chronologically in one Excel file based on the composition of the group. Rather than 33 separate documents, we now had one document that could be used for further analysis.

The second step was designed to describe the context in which the brokers were positioned. The project documents were analysed, and codes based on the elements of the general model of an activity system (Engeström, 1987) were assigned to fragments in the documents. After agreement on the description of the

activity system by the first two authors, validation by the project manager was requested. This led to some small textual changes.

In the third step, the minutes of the meetings were analysed. This led to an overview of topics that were discussed during the course of the project. Subsequently, we used these topics to code the brokers' open response answers in the process reports. Within each topic, subcoding was used to code the different actions carried out by the brokers during the course of the project.

In the fourth step, the qualitative data from the focus group and the reflective reports were connected to the elements of CHAT. The selection of these fragments was wide-ranging so that the richness of the data was maintained at this stage. Then the first cycle of coding was started (Miles et al., 2014). We used evaluation coding to note whether brokers made a positive or a negative remark. Negative remarks indicated perceived resistance or opposition, while positive remarks indicated perceived approval or acceptance. A neutral code was used for remarks that could not be classified as either positive or negative. The evaluation coding was complemented by descriptive coding (to note the topic) and subcoding or in vivo coding (to note qualitative evaluative comments). In this step, therefore, we specifically focused on and selected brokers' positive and negative remarks regarding actions and perceived impact. It is important to note that the focus was on illuminating the brokers' experiences within their own activity system, frequency of actions and impact were therefore ancillary.

Finally, in the fifth step, the second cycle of coding applied axial coding to examine the relations and interactions of the elements of the activity system. We deepened our analysis of step four to explain brokers' conflict experiences during their efforts to transform the activity. As Engeström (2001) argues, the 'object-oriented actions are always, explicitly or implicitly, characterized by ambiguity, surprise, interpretation, sense making, and potential for change (p. 134). This second cycle of coding enabled us to link data across elements and thereby illuminate the brokers' conflict experiences within the temporary activity system.

The first and second author led the first and second cycles of coding. Differences in coding were discussed in the research team until consensus was reached.

## FINDINGS

### Past, present and future of the activity

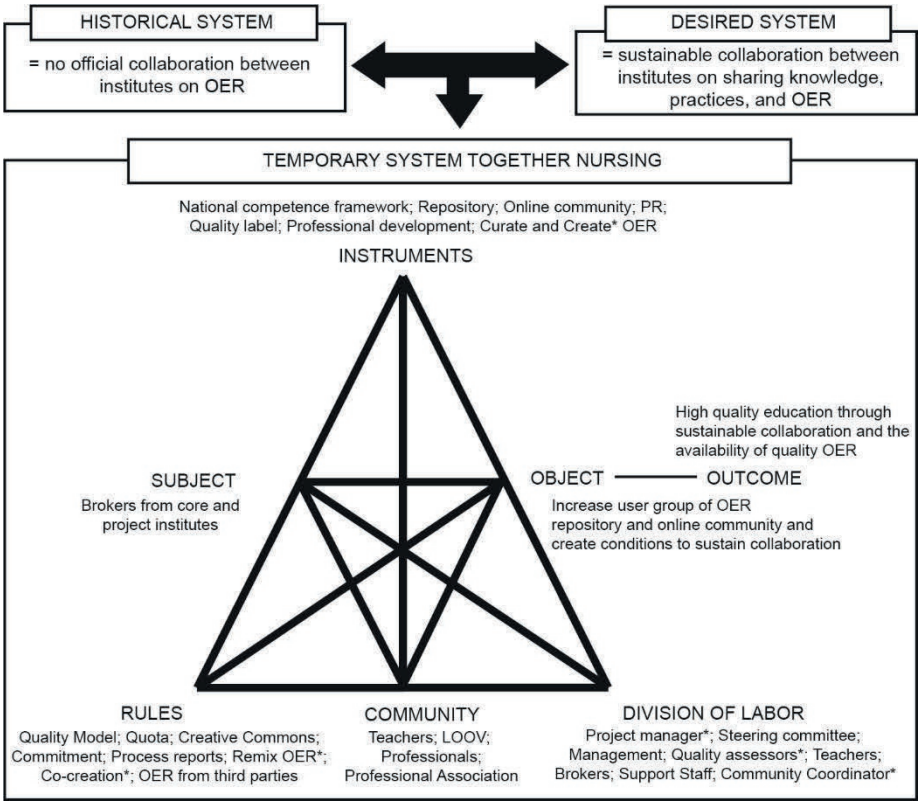
As it is important to take the history of the object into account as it impacts how it is interpreted by the people engaged in the activity, this paragraph describes the historical activity system and the desired future activity system. It was hoped that the desired system would have evolved by the end of the temporary project system *Together Nursing* in which the brokers were operating.

*The historical activity system vs. the desired activity system*
In the historical activity system, all institutes operated independently of each other regarding teaching practices and resources. Of course, teachers might have collaborated across institutes in this historical activity system but, if they did, it was either hidden, incidental or informal. An opportunity to extend collaboration across institutes arose in 2012 when a new professional profile was presented by the professional nursing association. This led to a collaboration across institutes (united under the umbrella of the National Consultation on Nursing Education (LOOV)), which resulted in a collaboratively designed new curriculum called Bachelor of Nursing 2020 (BN2020) in 2016. Around the same time, the Ministry of Education launched a grant program for one-year projects to explore the creation and sharing of OER across institutes. BN2020 offered an ideal context since (1) it provided institutes with a common language and (2) new topics in the curriculum compelled institutes to develop new resources. Subsequently, in 2017, a pilot project was instigated by five institutes to explore opportunities for collaboration and possible technical infrastructure (OER repository and online community). Due to the success of this project, it was decided to continue and extend the collaboration to all institutes that offer BN2020. Thus, a temporary project system was initiated to realize the desired future activity system in which sustainable collaboration between institutes on sharing practices, knowledge and OER within the nursing discipline would be accomplished. This project, called Together Nursing, that ran from 2018-2020, was the focus of this study.

*The present activity system*
We investigated the perspectives of the operating brokers within the present activity system. A visual representation of the elements and interrelationships of this activity system is presented in Figure 4.2. This section provides a description of the present activity system, but a more detailed description is available in Appendix C.

Brokers were operating in the activity system to endorse the project objectives within their institutes. Their actions were shaped by the object of the temporary activity system which was: (a) to expand involvement in the sharing and reuse of high-quality OER and participation in the online community to teachers across all 15 institutes; and (b) to create structures and conditions to foster the sustainability of the collaboration after the project period. Brokers applied mediating instruments within their institute to turn the object into the desired outcome. Brokers for example, applied different means to encourage teachers to engage with the OER repository and the online community, including professional development, advertising and mailings, and curation of OER. However, brokers are part of the collective activity thus interaction between subject and object is not only mediated through instruments, but also by the interrelations between the community of actors in the activity system who share the general object; the implicit and explicit regulations, norms, conventions and standards that constrain actions; and the division of labour between actors in the community (Engeström, 2001).

Figure 4.2
*A visual representation of the context in which the brokers were operating*




*Note*. Specific tasks of core institutes specified by *

The community comprised of approximately 600 participants, mainly teachers from the 15 institutes. Collaboration was sought with the professional nursing association as well. The community shared the outcome of high quality education through sustainable collaboration and the availability of quality OER. Brokers interacted with the community, but at the same time certain rules were imposed in this temporary activity system which impacted the actors in the community. For example, each institute was allocated and committed to share a specific number of OER (quota); a quality model had been developed and adopted which provided teachers with guidelines to optimize the quality of their resources; and brokers attended frequent evaluation moments to discuss progress and possible issues within the institutes. These explicit regulations and standards shaped the actions of everyone in the community, including the brokers as it deviated from the traditional way of working. Brokers also had to navigate both the 'horizontal division of tasks and the vertical division of power and status' (Engeström & Sannino, 2010, p. 6). The activity was organized according to the division of labour distributed across all 15 institutes, although the core institutes had more responsibilities than the project institutes. Within the institutes, management had given their commitment to the present activity system and the desired outcome. The project manager had the coordinating

role in the project by monitoring progress and disseminating knowledge, and the project itself was overseen by a steering committee which could intervene if progress within an institute stalled. Quality assessors assessed the OER in the repository on the indicators of the quality model and, if the OER complied with them, they awarded a seal of approval. To foster sharing and reuse of OER, teachers were supported by support staff (e.g. library, ICT or educational support).

Conclusively, the analysis of the present activity system stress the interrelations between elements of this complex reality in which the brokers were operating. Brokers aimed to transform the collective activity through their actions which we discuss in the next paragraph ('Brokers' actions and impact), albeit this did not occur without conflict experiences which we discuss in paragraph 'Brokers' conflict experiences'.

## Brokers' actions and impact

The object of the brokers was to increase the user group of the inter-institutional community around OER and to create conditions to sustain this collaboration. Brokers' experiences of their actions and the impact of those actions are presented and illustrated in this section.

### *Brokers' experiences of their actions*

Brokers enacted several instruments to encourage teachers (i) to engage with the inter-institutional community, (ii) to use the OER repository, and (iii) to use the online community. Additional actions were aimed at (iv) creating the necessary organizational structures. An overview of the actions as executed by the brokers is provided in Appendix D.

Brokers initially used advertising, mailings and large-scale meetings to encourage teachers. These instruments enabled them to reach a large number of teachers, but due to difficulties they experienced getting teachers to engage with these instruments, brokers shifted to small-scale, personal and content-oriented approaches. For example, Kim explained: 'In the beginning, we mainly organized some larger meetings. First meetings within the educational programs, then in the various teacher teams. The more it became individual, in groups of six but indeed also individual like 'hey, I'll bring you up to speed, come and sit down' […], the more it became widely supported'. Professional development was also used by the brokers to offer teachers support (sometimes one-to-one) to engage with the inter-institutional community.

Other actions were specifically directed at the creation, sharing and reuse of resources in the repository. For example, to foster reuse, brokers showed relevant resources that aligned with teachers' teaching content or they stressed the relevance of the repository for curriculum reforms. To foster sharing, brokers scheduled plenary sessions to share OER, applied the metadata form or uploaded OER for teachers themselves. Actions that aimed to invite teachers to voluntarily share resources on their own (e.g. open call, stress the quota) were experienced as less successful. For example, one broker explained that she herself would

'actively search for beautiful resources in the digital learning environments to share [in the OER repository]. I would recommend this method to everyone, instead of focusing solely on the quota. It is much more rewarding to look at what colleagues do in their classes and to share the best components with colleagues at other universities of applied sciences.'

Other actions aimed to cultivate the online community. Brokers emphasized the value of the online community among teachers by explaining its relevance to their teaching content and practice. As one project broker stated: 'Teachers need to get a clear picture of "What's in it for me? Does it make my job more efficient? Easier? More fun?" Then they'll be willing to participate.' An action that brokers would like to have included was to also extend the online community with face-to-face meetings. Kim made clear that teachers expressed 'a need to see who you're collaborating with' but this was not possible due to the covid-19-pandemic.

Additional actions were directed at structuring the division of labour within both the project organization and the organizations of the institutes. For example, brokers stressed the importance of the role of the project manager, the quality assessors, their role as brokers and other enthusiastic persons within the project organization. Chloe made this clear by saying: 'I think that the broker role is a crucial factor. You also need a good project manager, but the broker's role is so essential. Yes, […] you need a driving force who encourages people based upon their own enthusiasm.' Brokers also directed their actions to realize new structures within the institutes. Brokers were positive about the pre-conditions they had created that would contribute to the new activity. Collaborations with the libraries were initiated and teachers' engagement in the inter-institutional community was integrated into HR interviews. Yet, at the same time a few brokers stated that it did take much more time than expected to create the necessary pre-conditions within the institute and that the collective responsibility should have been stressed earlier on. Xander explained this by saying: 'I think that we could have done a better job of explaining within the team how we would attain the number of open resources. That doesn't take away the fact that everyone was enthusiastic about the project. I think that this […] has been emphasized more than the collective responsibility of sharing resources.'

*Impact of brokers' actions*

The goal of brokers' actions was to transform the collective activity. In relation to the object of the temporary activity system, brokers stated that enthusiasm for the Together Nursing project was commonly expressed by teachers and by nursing professionals alike. Brokers felt that their actions to encourage teachers to engage in the inter-institutional community did indeed lead to an increase in teachers using the OER repository and the online community. Teachers used the repository to find resources or to gain inspiration. Kim illustrated this by saying: '[I could] give an example of a clinical reasoning lesson that was approached in a specific manner by some colleagues. They used lessons with different approaches [from the repository]

to provide students more custom-made lessons'. The online community provided a place to connect and share practices, insights or questions. Xander explained that this led to a shared problem space: 'I thought I was the only one in the country who was facing this problem […]. And now all of a sudden, I know that, well, almost all universities have this problem'. Additionally, brokers noted that barriers between institutes diminished, resulting in a strengthened collaboration across institutes. For example, Sarah explained that: 'without coordination, new collaborative projects would not have come into being […]. Collaboration has been achieved and the […] limitations or the barriers to not only having a look at the other [institutes], but to also using them or to having the confidence to create something together, seem to be falling away. It happens more quickly and easily'.

In addition to the intended transformation, brokers mentioned that their actions also impacted teachers and institutes in other ways. They stressed, for example, that teachers gained an increased awareness of the outline of the curriculum. Sarah explained that: 'this project has contributed that […] people not only look […] within their own subject area but also look at how it relates to other lessons. I [notice] that people have an increased awareness of the entire curriculum and [they] also notice if there is something missing, if something should be added or if there are possibilities for changes.' Within the institute, brokers explained that the adoption of the quality model resulted in a conversation within the institutes about quality. As Tony explained: 'Those [quality] criteria have been accepted by our curriculum committee, the curriculum council, and they actually use it to assess new courses […]. What do we consider quality? What do you check? That [conversation] has become a lot more introspective'.

*Core versus project brokers*

We can deduce from the brokers' individual experiences that it was difficult to encourage a large number of teachers to engage with the inter-institutional community around OER. A small-scale approach was perceived as the most successful. Both core and project brokers experienced the set quota (rules) as a hindrance. Actions that aimed to invite teachers to voluntarily share resources on their own were not that successful, which resulted in brokers taking up this task themselves. However, a difference in attitude regarding these rules became evident. Whereas the core brokers agreed that the top-down quota was an impediment, they also emphasized that it was a means to make the yielded deliverables transparent. Or as Michelle stated: 'When you receive grant money and therefore hours, […] I consider it very reasonable and normal that you are also obliged to show that you work for […] the project. And the most tangible thing is that you ensure that educational resources are shared. […] And do I like doing it? No, but I do see why and I also think it is justified.'

When comparing the impact of brokers' actions as perceived by the core brokers versus the project brokers, a sharp contrast was discernible. Whereas core brokers described several positive impacts of their actions, the project brokers were more negative. The only positive impact they mentioned related to the enthusiasm

among teachers and their awareness of the existence of the repository and the online community. Moreover, core brokers seemed to be more conscious of the fact that the realization of the desired activity system takes time. Michelle for example stressed her experience that 'I do think it is also something that we've all experienced […] that there is a really very long running-in period'. And Kim explained that they made the conscious choice to take one step at a time: 'We said okay we have now participated with the grant application and the [corresponding] deadline. We're just going to focus on that deadline right now […] and after that we will focus on the sustainability'.

### Brokers' conflict experiences

Brokers encountered several conflict experiences while executing the different actions to cultivate the inter-institutional community. This section presents these perceived conflicts in which we refer to the elements of the activity system as presented in Figure 4.2.

Although brokers reported an impact of the inter-institutional community around OER on teachers' practice, they experienced conflicts as they felt that their actions had not led to a major transformation of the teachers' entire work activity (object). Brokers mentioned that use of the repository was limited and that willingness to share resources was still a major impediment. As one project broker explained: 'Colleagues do not use [the OER repository] and also prefer not to share. They are still afraid that others will run off with their ideas and [they] don't want to be convinced of the fact that there are always rights attached [to their resources]. Colleagues do not take the time to search and look around [the OER repository]'. The same applied to use of the online community. While the online community did foster knowledge sharing and exchanges of practices, brokers reported that not all teachers made use of the online community. In particular, a number of specific theme groups were frequently used by teachers from different institutes, but as one broker stressed: 'Few teachers participate in the [online] community and they indicate that they have no need for it. Where there is a need [...] people will connect with each other. […] but teachers who do not have a specific area of interest or responsibility within the education program do not see what the community can offer them. No matter how much you promote it.'

Brokers not only reported that the new activity was not widely endorsed within the institutes, other conflict experiences relating to elements of the project activity system also emerged. Brokers struggled, for example, with the ambiguity and the responsibilities of their role (subject). Michelle explained this by stating that 'Well I think as far as I'm concerned that distinction between the broker role and the project leader role was indeed quite ambiguous within our institute.' Brokers also felt the pressure of their responsibility. As Chloe explained: 'If other people don't take up their task, I will. That's my downfall, but this project has shown over and over again that this is very difficult. If you delegate something to other people, will it happen?' This tension in the broker role was amplified due to the quota imposed by the project (rules). For example, Kim explained: 'First create the support capacity

and FTE at the support staff (such as the library) before making concessions on the quota. The project must be broadly supported. I was largely responsible and on my own'. Jack also illustrated the consequence of this quota by saying: 'What's been difficult from the beginning, is that the project within our institute had a bit of a top-down approach. It seemed like, in our case [colleague] came up with numbers and targets every quartile that we had to meet. Which made it seems like we were a project in the name of the management.' At the same time though, coordinating with management to plan actions to realize the intended transformation was an issue (division of labour). Tony illustrated this dilemma by sharing his experience: 'What I ran into very much was that […] it shouldn't just be between quick contacts. Do you have something for me? There also has to be a commitment from the team […]. And the annoying thing was that the management gave their commitment, […] but the moment you say "guys what are we going to do now?", it was all toned down like "no [teachers] shouldn't feel obliged and they don't want to". Well, then nothing happens.' At the same time, brokers were also impacted by organizational changes relating to reorganizations as well as high enrolment of new students which in turn resulted in personnel changes (community and division of labour). These changes were magnified by the impact of covid-19 on teachers' practices. Jack explained: 'We have just gone through a reorganization. We also just had a very high enrolment and the expectation is that the number of students will increase next year as well. And because of that, the number of teachers will also increase. […] If you see right now how [teachers] are overwhelmed in the Covid time with other ways of working, then I really feel sorry for them'.

## DISCUSSION

This descriptive qualitative study set out to illustrate the role of brokers in cultivating inter-institutional collaboration across 15 higher education institutes. We applied CHAT as it offers a conceptual framework for analysing the role of the broker within the background of the entire activity system. Our findings show that brokers used several instruments to encourage teachers to engage with the inter-institutional community, to use the OER repository, and to use the online community. Additional actions were aimed at creating the necessary organizational structures. Brokers concluded that although a wide range of instruments were needed to foster the transformation, the small-scale, personal and content-oriented approaches to encourage teachers to engage with the OER repository and the online community were perceived as the most valuable. The brokers were key in this regard, since they had the central position within the institute as peer colleagues whilst also having the expertise to relate to the teaching content. Yet, at the same time the findings show that brokers encountered conflict experiences due to the demanding context in which they were operating, the organizational constraints they were confronted with, the ambiguity and responsibilities of their role and the limited perceived impact on teachers' practices. In this section, we will discuss both the theoretical and practical implications for collaboration across higher education institutes that follow from our findings.

## Brokers as boundary spanners

CHAT proved to be a valuable framework for gaining insight into the role of brokers because it emphasizes the sociocultural elements and its interrelations that shape collective actions directed at the shared object. Therefore, CHAT offered ample opportunities to gain a deeper understanding of the elements, and the relations between the elements of the activity system. Figure 4.2 visualizes the nature and relationships within and between elements. The analyses illuminated that brokers' actions yielded the intended transformation of the collective activity, albeit to a more limited extent than expected. Brokers were able to apply actions to engage teachers with the inter-institutional community while also acting to create organizational structures, but a major transformation did not occur. The role of the broker was hindered due to conflicts they experienced. Despite their efforts and the enthusiasm that they received from teachers and health professionals alike, brokers noticed that the desired object was still not widely endorsed within the institute at the end of the project. It could be that the expectations were too ambitious to encourage all teachers within the institutes. We therefore align with the recommendation of Akkerman and Bruining (2016) that specific developmental aims distributed across time should be formulated through which choices can be made about who to involve and when to involve them. It could be more gratifying to focus on willing teachers at the beginning with the hope that good practices would trickle down to other teachers over time. At the same time, a mismatch was often found between practice and institutional responsibility and structures that hindered the transition from conventional teaching to new practices embedding OER (Kaatrakoski et al., 2017). Kaatrakoski et al. therefore stress that organizational change management is critical to encourage teachers to transfer from the historical to the desired practice in which OER and collaboration are part of teaching practice. Even though brokers were able to make changes within the organization by altering the historical-cultural system to the new processes and operations (e.g. by setting up partnerships with the library, by integrating OER into HR interviews), the rules of the project activity system and the limited support from management proved to be impediments to success. Management did not empower the brokers within their role even though it was important that they receive organizational recognition and support to assist them in their role (Akkerman & Bruining, 2016). The brokers' lack of power was exacerbated by detrimental effects of organizational and societal issues. Reforms within the departments, a high number of new teachers and Covid-19 influenced brokers' actions and diverted the focus from the inter-institutional collaboration on OER. Those issues greatly influenced the brokers while they had limited capacity to counteract them. Although not all challenges are easy to overcome, brokers must feel supported in their boundary spanning role. We therefore agree with Prysor and Henley (2018) that leaders ought to change their leadership to not only focus on leadership within teams but to also include leadership that supports boundary spanning.

In conclusion, brokers were essential in cultivating the inter-institutional community due to the unique positions they held among colleagues even though

challenges that must be overcome also emanated from this position. The findings of this study not only provide new insights into the role of brokers in fostering educational change through OER in higher education collaboration, it also corroborates the work of other studies on antecedents of boundary spanning behaviour (Van Meerkerk & Edelenbos, 2018).

### Implications for practice

The main question that arises from our discussion is how brokers can be supported in their role to cultivate collaboration across institutes. The strengths of using CHAT were that it gave us a theoretical lens with which to examine the complex and evolving activity system in more detail. It enabled us to examine the brokers' actions, but it would be of interest to also explore other perspectives (subject). The conflicts that brokers encountered derived partly from the clashes of views that sometimes occurred between brokers, managers, support staff and teachers. It is essential, therefore, to address the multi-voicedness of the object by discussing it regularly with all stakeholders since 'expansive learning is an inherently multi-voiced process of debate, negotiation and orchestration' (Engeström & Sannino, 2010, p. 5). If necessary, let go of the initial object and alter it to align it with the local context so that sustainable practices may be realized (März et al., 2017). Additionally, brokers must be aware that although it might appear that actual change in teachers' practice has been limited, sustainable change takes a long time and actual participation in online communities is always differentiated between a minority of participators and a majority of onlookers (Lantz-Andersson et al., 2018). Even so, only a few teachers prefer online networking (Van den Beemt et al., 2018) and online collaboration in combination with face-to-face meetings would be advised. Finally, brokers encountered role stressors due to the ambiguity and responsibilities of their role. They deployed a plethora of actions to foster change whilst also setting up needed organizational structures. A broker should therefore be facilitated by the project manager giving clear expectations on tasks, responsibilities and intended outcomes while simultaneously being provided with time, empowerment and organizational support from the institute. At the same time, brokers' role stressors could be lessened if teachers recognized and valued the act of boundary crossing across institutes. We therefore suggest that institutes advocate for collaboration across institutes to follow up on the recommendation of Oonk et al. (2020) that boundary crossing competence be incorporated into teacher competence profiles.

### Limitations and future research

It is important to note that this study had some limitations. First, although some institutes had more than one broker, we decided that it would be sufficient if one broker participated in the study to limit time investment during the Covid-19 pandemic. Even then we were not able to recruit brokers from all institutes since some did not respond to the researcher's invitation to participate. Because of this we were not able to capture all brokers' experiences. However, we believe that this limitation was partly ameliorated by combining different data sources and by having

a mix of both core and project brokers. Second, this was a reflective study but it would be helpful to examine how brokers' experiences changed during the course of inter-institutional collaboration on OER. Future research could apply longitudinal designs by, for example, using cyclical interviews, videotaping project meetings, or by using logs to follow brokers up close. It would also be interesting to gain more insight into collaboration between brokers. Third, although this study improved our understanding of the role of brokers within a specific highly contextualised case, we relied on the brokers' perceptions. It would be worthwhile to further explore the roots of the conflict experiences by shifting the focus from the brokers' action level to the activity level so that changes within the institutes and in teachers' practices could be investigated. In that way, contradictions within and between activity system could be substantiated (Engeström & Sannino, 2010).

# 5

# What's in it for me? A mixed-methods study on teachers' value creation in an inter-institutional community on open educational resources in higher education

This chapter is based on:
Baas, M., Schuwer, R., Van den Berg, E., Huizinga, T., Van der Rijst, R., & Admiraal, W. (2023). What's in it for me? A mixed-methods study on teachers' value creation in an inter-institutional community on open educational resources in higher education. *Education and Information Technologies, 28*, 6049-6074.
https://doi.org/10.1007/s10639-022-11424-7

ABSTRACT. The affordances of Open Educational Resources (OER) have resulted in various initiatives around the world, but most of them cease to exist once the initial project funding stops. Communities might be a means to create sustainable practices, yet, such communities can only function if their members perceive these communities as valuable. We applied the value creation framework of Wenger, Trayner, and De Laat to examine the value teachers ascribe to their engagement with an inter-institutional community on OER. In this community, 15 universities of applied sciences collaborated on sharing knowledge and resources across their institutional barriers. We collected data through user statistics, an online questionnaire, and semi-structured interviews. Major value creation occurred from teachers' personal needs, with dominant immediate and potential values. Findings on applied and realized values denote that it became easier for teachers to connect with peers, and to initiate collaboration projects across institutes. The framework we used is helpful to inform actions to further promote value creation in communities on OER. Recommendations relating to communities' aspirations, its relations with the wider organization, and adoption of OER are formulated to inform sustainable practices of inter-institutional communities.

## INTRODUCTION

Teachers in higher education use a variety of resources to shape their curricula and courses. Opportunities afforded by Open Educational Resources (OER) get more and more attention. OER can be defined as 'learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, reuse, re-purpose, adaptation, and redistribution by others' (UNESCO, 2020, par. I, point 1). OER have the potential to improve teaching and learning in higher education. Teachers, for example, have access to a wide variety of resources allowing them to vary their pedagogical and didactical approaches (Clinton-Lisell, 2021). In addition, students do not have to buy commercial resources, which means students might have equally access to quality materials (e.g. Wiley et al., 2016). This in turn could lead to an increase in OER-enabled pedagogy in higher education resulting in affordable and accessible education of good quality (Stagg, 2014; Wiley & Hilton, 2018). These affordances of OER have resulted in a wide array of initiatives around the world, but unfortunately not all of them turn out to be sustainable; many OER initiatives cease to exist once the initial project funding stops (Orr et al., 2015).

To support and encourage sustainable OER practices at national, regional, and institutional levels, UNESCO, in its Recommendation on OER (UNESCO, 2020), formulated 'nurturing creation of sustainability models for OER' as one of the five Areas of Action. One aspect of this specific Action focuses on 'promoting and raising awareness of other value-added models using OER across institutions and countries where the focus is on participation, co-creation, generating value collectively, community partnerships, spurring innovation, and bringing people together for a common cause' (par. iv, point c). In accordance with this recommendation, interest has increased in community building in relation to OER.

Communities on OER might have the potential to foster sustainable practices (Orr et al., 2015; Wang & Wang, 2017). Yet, such communities can only function if their members perceive these as valuable. If teachers do not feel that participation in a community gives them some value, engagement will decrease and the community will fall apart (Wenger et al., 2002). Hence, value creation is essential, as it can inform communities on cultivating and maximizing their value for participants (Wenger et al., 2011). With this in mind, the present study was set out to examine the value teachers ascribe to their participation in an inter-institutional community on OER and other related aspects of teaching. Our aim is to contribute to the understanding of cultivating value in order to make sustainable OER initiatives more common.

## THEORETICAL FRAMEWORK

### Towards sustainable OER communities

Sustainability of OER initiatives is a concern that has received considerable attention in recent decades. About 15 years ago, Downes (2007) specified that sustainability models relate to (a) the funding of the initiative, (b) the technical sustainability of OER related to the development and distribution of quality OER, (c) the content and the type of OER that impacts its lifespan, and (d) the selection and hiring of staff which is needed to cultivate and sustain the initiative. Recently, new insights on the evolution of sustainability models for OER in higher education have been presented by Tlili et al. (2020). They outlined 10 models, such as models that aim at gaining funding (e.g. internal or public funding), models that aim at generating funding (e.g. offering learning-related data to companies or producing OER on demand), and models that focus on communities (e.g. participation in an OER network). Although the authors clearly distinguish between the 10 models, they nevertheless stress that in practice institutes often implement a combination of some of these.

Regardless of these 10 sustainability models, the aspect of community building is paramount for all OER initiatives, as there must be a shared belief in the value of the collaboration (De Langen, 2018). Value can generally be described as importance, worth, or usefulness (Wenger-Trayner et al., 2019). Value creation is crucial as it determines whether teachers will engage with the OER initiative. This in turn will decide whether a community will grow and develop. Measures of success relate to the size of and the activities in a community, but these aspects of increasing the size of the user group and nurturing the creation of a community are the key challenges for OER initiatives (Orr et al., 2015).

These challenges are explored by previous studies that have examined enablers of community engagement. For example, Wang and Wang (2017) and Stagg and Partridge (2019) examined a community-based approach to foster the adoption of open textbooks into the curriculum. Their findings indicated that a deliberate strategy is needed with a dual focus on a supportive learning space for teachers to have discussions, generate ideas and to experiment with open textbooks, and on the role of facilitators to organize structured meetings and to connect teachers' needs with information and expertise within the institute. In line with this, Baas et al. (2023a) showed the importance of brokers in cultivating an inter-institutional community on OER. Due to their personal, small-scale, and content-oriented approaches, brokers were pivotal in encouraging teachers to engage with the community.

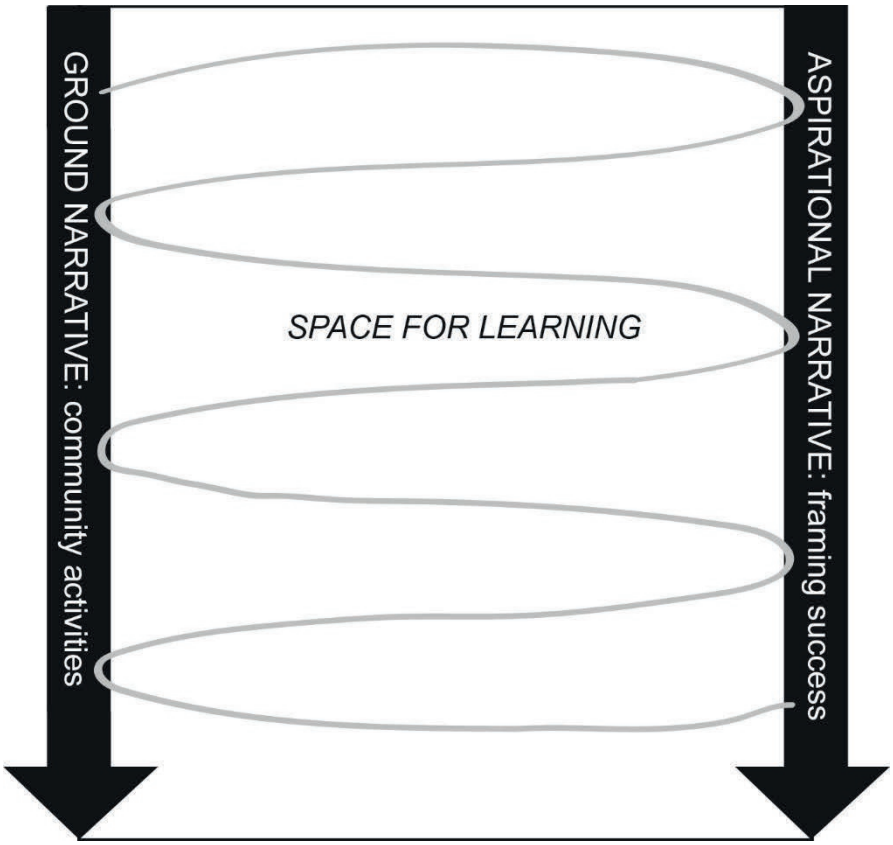
Collaboration between universities can enable transformational change in higher education through which collaborative learning practices can evolve and social inequalities can diminish (Laufer et al., 2021). However, although some communities on OER flourish (e.g. MERLOT, CCCOER), most of them simply tamp out. To foster the number of sustainable OER initiatives, we must strengthen our understanding of cultivation of communities on OER with specific and empirical insights into teachers' perceived value.

## Value creation in communities

As mentioned above, communities are only viable for as long as their members experience value. For the viability of communities, value creation is essential: participation costs time, meaning that 'most community members experience both internal and external pressure to discover and deliver value soon after the community starts' (Wenger, 2002, p. 84). It is therefore important that organizations support the community by creating an environment in which participation is encouraged (Wenger et al., 2002). In this study, we explore a community on OER that has the structure of a community of practice in which teachers voluntarily collaborate and share knowledge and resources on a common topic. The community members are pivotal in maintaining continuous interaction and engagement and thereby determining the sustainability of the community, which means this collaboration should be perceived as valuable by the participating teachers.

The value creation framework (Wenger et al., 2011) provides a structure to examine value creation in communities. This framework can be used as an analytical tool to examine in what ways teachers find value through their participation with a community. Personal and collective narratives can be collected to create an account of value creation. Two functions of these narratives must be considered. The ground narratives are stories of the members about the past and current everyday life of a community that has shaped the development of the community. For example, it includes the interactions that teachers have with others, and the activities they are involved in. The aspirational narratives are stories about what the community is expected to produce, which evolves over time. For example, it includes teachers' individual expectations of what their engagement in the community will provide for them, as well as the collective value a successful community should provide. The tension between these ground and aspirational narratives creates a space for learning (see Figure 5.1). It is within this space that the following five cycles of value creation can be defined (Wenger et al., 2011): immediate value, potential value, applied value, realized value and reframing value. Table 5.1 describes these values in more detail. These five value cycles are not hierarchical or mutually exclusive. The collaboration and interaction among teachers in communities can lead to perceived value in one cycle or in multiple cycles, and this does not imply that one value cycle is inferior to another.

Figure 5.1
*Productive tension between ground and aspirational narratives (based upon Wenger et al., 2011)*




These cycles of value creation have been explored in various studies on networks and communities and from several perspectives. Previous studies have, for example, examined value creation from the perspective of teachers (Booth & Kellogg, 2015; Van Waes et al., 2016; Zaalouk et al., 2021), students (Dingyloudi et al., 2019; Forbes, 2020; Mavri et al., 2021), volunteers (Hanley et al., 2018), and participants in a cross-border learning network (Clarke et al., 2021). However, within the domain of OER, insights into value creation within communities are scarce. Although earlier studies have focused on communities on OER (Borthwick & Dickens, 2013; Burgos-Aguilar, 2013; Smith & Lee, 2017; Tosato et al., 2014; Tosato & Bodi, 2011), these studies merely revolved around initiating and realizing the community. Little insights are available that explored the value teachers ascertained to their engagement within such communities. Yet, improving our understanding on the question that teachers might ask themselves: 'what's in it for me?', would be beneficial to foster sustainable OER communities.

**Table 5.1**
*Value Creation Framework (Wenger et al., 2011)*

| | Value | Definition | Description |
|---|---|---|---|
| 1 | Immediate value | Community activities and interactions | Answer to a question, a solution to a problem or help with a challenge. |
| 2 | Potential value | Knowledge capital | |
| | *Personal assets* | *Human capital* | Useful skills, a key piece of information, or a new perspective. Personal value can be inspiration, caring, confidence and status. |
| | *Relationships and connections* | *Social capital* | Knowledge as a collective good distributed across the community. Social resources can facilitate learning and communication which can lead to opportunities for collaboration and the ability to promote a cause. |
| | *Resources* | *Tangible capital* | Access to resources (e.g. documents, tools, procedures, links, etc.). |
| | *Collective intangible assets* | *Reputational capital* | Reputation of community, status of profession, collective voice or recognition it provide within organization. These assets increase the potential for collective action. |
| | *Transformed learning* | *Learning capital* | Value the way of learning in communities, transfer learning to other contexts. |
| 3 | Applied value | Changes in practice | Adapting and applying knowledge capital. This can lead to changes in actions, practice, tools, approaches, or organizational systems. |
| 4 | Realized value | Performance improvement | Performance improvement. Changes in practice does not guarantee performance improvement. Reflect on effects of application of knowledge capital. |
| 5 | Reframing value | Redefining success | Redefining success and learning imperatives (e.g. reframing strategies, goals, values). Success can be redefined at individual, collective, and organizational levels. |

## METHOD

The purpose of the present mixed-methods study was to characterize the value creation that occurred within the inter-institutional community. The findings of this study will provide insights into the different value cycles that can be provided by communities on OER, which may help to expand our understanding of the sustainability issues of OER initiatives.

### Research context

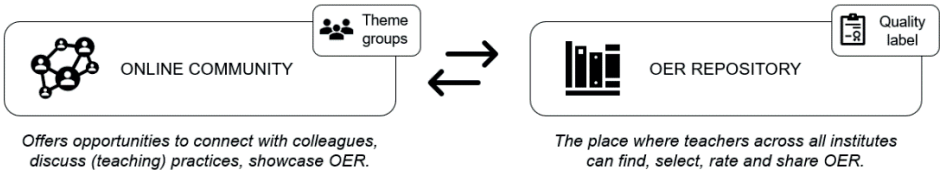
Since 2015, policies in the Netherlands have focused on supporting OER in higher education (OCW, 2019). Subsequently, the Dutch government initiated a national funding program by which higher education institutes were encouraged to explore inter-institutional collaboration on OER. In this mixed-method study, we explored one of these projects in which 15 universities of applied sciences collaborated on sharing knowledge and resources across their institutions within the domain of Nursing Education. The aspirational narrative of this community was to realize a sustainable OER initiative in which sharing and reuse of OER within an active professional community of teachers across institutes is common practice.

As collaboration within communities on OER does not happen spontaneously (Tosato et al., 2014), two interconnected digital platforms were used to promote and support engagement and interaction: an online community and an OER repository (see Figure 5.2). In the online community, teachers could connect with colleagues, discuss OER and teaching practices, or articulate needs for collaboration. Various thematical groups were created in which teachers could connect and discuss certain themes. In the OER repository, teachers could search and share resources; a quality label was provided for resources that met predefined quality criteria. In addition to these technological platforms, each institute allotted brokers as a linking pin between the project and the institutes to cultivate the community.

This community originated upon existing Nursing Education networks. By utilizing these existing networks, the sustainability of the initiative could be more feasible (Schreurs et al., 2014). Sustainability was also pursued through institutional funding after the initial national funding (2018-2020) had ended.

Figure 5.2

*Context of the study*

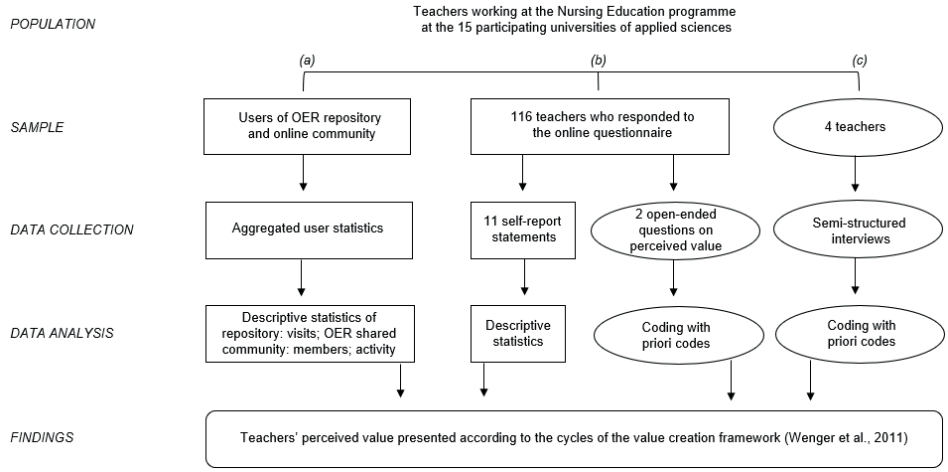


## Research design

We applied a convergent design (Creswell & Clark, 2018) in which both qualitative and quantitative data were collected in the same time period. The value creation framework allows to include various types of data (Wenger et al., 2011). In this study, data were gathered by (a) downloading user statistics of the OER repository and the online community, via (b) an online questionnaire, and through (c) semi-structured interviews with teachers, the users of the platforms. A visualization of the mixed-method design is provided in Figure 5.3.

**Figure 5.3**

*Visualization of the data collected in this mixed-method study*




## Procedure and participants

Ethical approval was obtained from ICLON-Graduate School of Teaching at Leiden University before conducting the study. Teachers were recruited from all 15 universities by open calls distributed within the online community and through the installed brokers within the institutes. An additional call to participate in the interviews was included at the end of the online questionnaire. The questionnaire was open for all teachers to participate in. For the interviews purposive sampling was employed: Teachers who participated in the OER community, and were not part of the project organization were eligible.

The questionnaire was available for teachers late September to mid October 2020. Participation was voluntary and data collection was anonymous as teachers were invited indirectly. The questionnaire had a (partial) response of 116 teachers. Among them, the majority were female (87.9%, n=102), which is representative with respect to the demographic statistics of nurses in the Netherlands (CBS, 2019). Table 5.2 provides the general characteristics of the participants.

Table 5.2
*General characteristics of participants in questionnaire (N=116)*

| Characteristics | Categories | Total (n/%) |
|---|---|---|
| Gender | Male | 14 (12.1) |
| | Female | 102 (87.9) |
| | Other | 0 (0.0) |
| Age | <26 years | 1 (0.9) |
| | 26 – 35 years | 34 (29.3) |
| | 36 – 45 years | 27 (23.3) |
| | 46 – 55 years | 29 (25.0) |
| | > 55 years | 25 (21.6) |
| Teaching experience | 0 – 2 years | 27 (23.3) |
| | 3 – 5 years | 36 (31.0) |
| | 6 – 10 years | 28 (24.1) |
| | > 10 years | 25 (21.6) |

For the interviews, a small sample was chosen because of the expected difficulty in obtaining teachers willing to participate due to the Covid-19-pandemic. Most teachers were either helping out in healthcare organizations or were fully occupied with the switch to online education. A total of seven teachers responded to the calls, but two teachers had to withdraw and one teacher was closely involved in the project organization and did therefore not meet the sampling criteria. In the end, four teachers participated in the interviews. Table 5.3 present the fictional names and background characteristics of these teachers.

Table 5.3
*Demographics and pseudonyms of the participating teachers in the interviews*

| Teacher | Age | Teaching experience |
|---|---|---|
| Marisa | 53 years | 17 years |
| Simone | 48 years | 17 years |
| Dafne | 44 years | 18 years |
| Will | 57 years | 15 years |

When inviting the participants, the purpose of the research was clearly explained. On obtaining informed consents from the teachers, an online meeting was scheduled. The interviews lasted between 30 to 40 min. The interviews were summarized and sent for member checking purpose. One teacher made minor changes, which related to the type of resources found in the repository.

## Data collection

Through user statistics, a questionnaire, and interviews we collected data in relation to the five value cycles. An overview of the different data sources for each value cycle is presented in paragraph 'Overview'.

*User statistics*

We collected user statistics to gain insights on teachers' participation in the platforms. Data of two indicators relating to immediate value were collected: level of participation, and level of activity (Wenger et al., 2011). For the OER repository, we had access to the number of page visits, and the number of OER shared. For the online community, we gathered the statistics on the number of members, and teachers' online activities. Only aggregated data were collected; no personal data were accessed.

*Questionnaire*

The questionnaire was designed to ascertain teachers' value creation in the community on OER. We included several pre-structured self-report questions and statements to assess teachers' engagement and value creation. We included items that we developed based on the OER Adoption Pyramid (Cox & Trotter, 2017) as no quantitative measurement tool exists to measure value creation. We related these OER specific items to several value cycles (see Table 5.4). Two open-ended questions were included to collect teachers' perceived value of both the OER repository and the online community. If teachers had used the repository, they were asked to describe the value of it for their practice and to give an example how it had affected their work. The same questions were posed if teachers had used the online community. The questions and the order thereof were discussed with the project manager of the inter-institutional community to ensure face validity. Afterwards, the items were discussed in the research team to ascertain content validity. See Appendix E for the questionnaire.

*Interviews*

The semi-structured interviews were conducted to gain detailed insights into the perceived value of the community on OER. We used the value creation framework (Wenger et al., 2011) to design the interview guide. The guide consisted of questions that were intended to collect teachers' value creation stories of both the repository and the online community. We asked generic starting questions that permitted the teachers to tell us their experience (e.g. can you tell me how you have used the repository?; how did the online community influence your practice?) after which the interviewer asked for elaboration or explanation when needed. At the end of the interview, teachers had the opportunity to express any additional thoughts. All interviews were conducted by the first two authors.

*Overview*

Table 5.4 presents the main data sources for each of the five value cycles. In addition, overarching questions were asked in both the questionnaire (e.g. can you give an example how the online community has influenced your practice? What have you gained from it?), and the interviews (e.g. can you give an example of how this influenced your practice?).

**Table 5.4**
*Overview of main data collected within value cycles*

| Cycle | Data source | Data collected |
|---|---|---|
| Immediate value | User statistics | Repository: number of page visits; number of OER shared |
| | | Online community: number of members; online activities |
| | Questionnaire: self-report statements | How would you characterize your usage of the repository? |
| | | How would you characterize your usage of the online community? |
| | | What activities have you undertaken in the online community? |
| | | I have shared resources in [the OER repository] or arranged for them to be shared (e.g. by the library) |
| | Interviews | Can you describe how you use the online community? |
| | | Can you describe how you use the OER repository? |
| Potential value | Questionnaire: self-report statements | I know how to search for resources in [the repository] |
| | | In [the repository] I can find resources that are relevant |
| | | In [the repository] I can find resources of good quality |
| | | I plan to (continue to) use resources from [the repository] in the future |
| | | I know the conditions under which I may reuse resources from [the repository] in my own teaching |
| | Interviews | Through teachers stories in which prompts were used to prodding further storytelling |
| Applied value | Questionnaire: self-report statements | I have used resources of [the repository] in my own education without making adjustments to them |
| | | I have used resources of [the repository] in my own education with making adjustments to them |
| | | I use the quality mark to determine the quality of resources in [the repository] |
| | Interviews | Through teachers stories in which prompts were used to prodding further storytelling |
| Realized value | Interviews | Through teachers stories in which prompts were used to prodding further storytelling |
| Reframing value | Interviews | Through teachers stories in which prompts were used to prodding further storytelling |

### Data-analysis

For the quantitative data, descriptive analyses were carried out on the user statistics data and the answers on the pre-structured questions of the questionnaire. Data from the open-ended questions in the questionnaire and the interview were analysed in Atlas.ti through two coding cycles (Saldaña, 2016). First, to gain sense of the data, we explored the transcribed interviews through a combination of process coding and evaluation coding. This enabled us to gain a first general impression about both the actions of teachers within the inter-institutional community and their judgments about the (non)merit and (non)worth of it. For the second cycle of coding, we developed a coding scheme based on the conceptual framework on value creation (Wenger et al., 2011). In several iterations, fragments within both the open-ended questions and the four interviews, were selected with these priori codes. Between iterations, the initial coding was discussed in the research team to gain consensus on the labelling of the selected fragments. The main disagreements in coding resulted from differences in interpretation of the codes 'immediate value' and 'realized value'. After modifying the labels that we allocated to the value cycles codes, the data were again analysed which resulted in a total of 145 labelled fragments. Some fragments received simultaneous coding in which multiple codes were assigned to parts of the transcribed text due to an overlap of multiple value cycles. This is in accordance with previous studies in which segments of narratives were not always exclusive for one value creation cycle (Booth & Kellogg, 2015; Mavri et al., 2021). This led to descriptions of the value creation within the five value cycles. Lastly, we revisited the data to visualize the value creation across cycles based upon the narratives of the interviewed teachers. We defined the relationships and continuity of their ascertained values based upon their storytelling. This enabled us to illustrate how a teacher's value creation traversed cycles.

## FINDINGS

The main findings are structured based upon the five value creation cycles. Prior to these, we present the interviewees' value creation stories to illustrate how value creation can occur across cycles. Then, we present our main findings, which include all data following the five cycles of value creation. Where applicable, each of these sections begins with the presentation of the quantitative data. Detailed insights are provided for each value cycle based on the qualitative data.

### Value creation stories

To better understand how the community is creating value, we examined the personal narratives of Marisa, Simone, Dafne, and Will and visualized their stories in Figures 5.4, 5.5, 5.6, and 5.7.

It became clear that each teacher ascertained different types of values to their participation in the inter-institutional community, but that there are also similarities across teachers. For example, Marisa, Simone, and Will mentioned that browsing the repository was fun and inspiring (immediate value). It provided them with access to a vast number of resources which resulted in either inspiration or a means to validate their teaching (potential value), whereas other OERs were implemented in their actual teaching practice (applied value). With regards to sharing resources, the four teachers mentioned that they had shared their resources in the OER repository. It primarily provided them with an immediate value of being able to share their resources to a wider community rather than only with their own students or colleagues. For Simone this also led to an awareness of the requirements of sharing OER (potential value), and she explained that within her team she became an advocate of OER (reframing value). For Marisa sharing resources also led to a redefinition of success. She shared her resources on a topic in which the university is a pioneer so that others could use and learn from them (potential value). At the same time, this also resulted in a personal redefinition of what Marisa believed are quality resources (reframing value). A final similarity is related to the potential value of social relationships as revealed in the stories of Marisa, Will, and Dafne. Will and Marisa explicitly mentioned that the OER community led to improvement of their practices, because connecting with peers across institutes for queries or collaboration became easier (realized value).

It is apparent from Figures 5.4, 5.5, 5.6, and 5.7 that most value was created across the immediate, potential, and applied value cycles, whereas less value was created in the realized and reframing values. These value creation stories are useful to understand how value can traverse cycles from an individual perspective. Yet, a more complete picture of the value created by the community can be obtained by combining data for each value cycle. Hence, in the next sections we present the value cycles from a collective narrative by inferring from all data.

Figure 5.4
*Value creation story of Marisa*

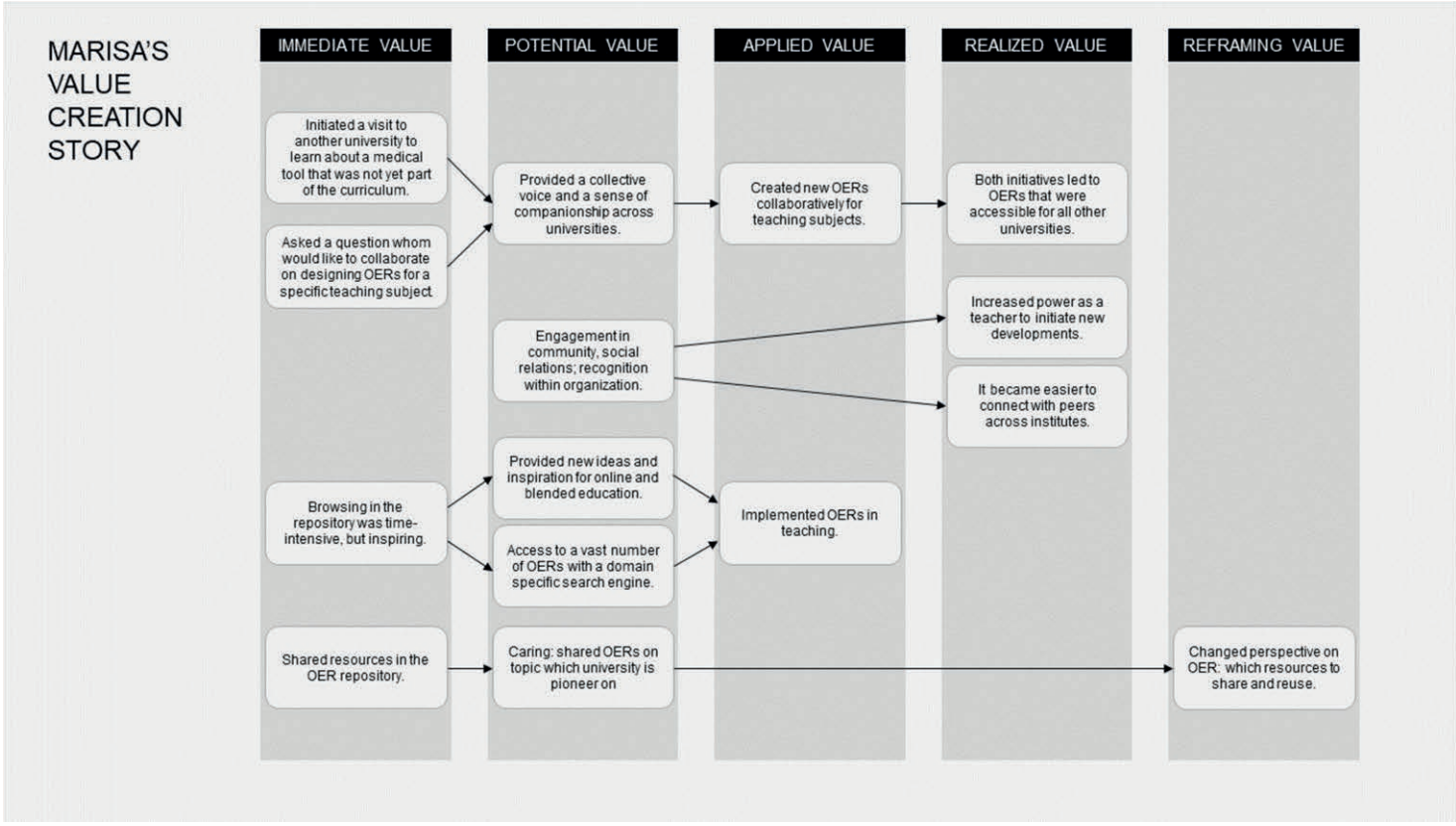


Figure 5.5

*Value creation story of Simone*

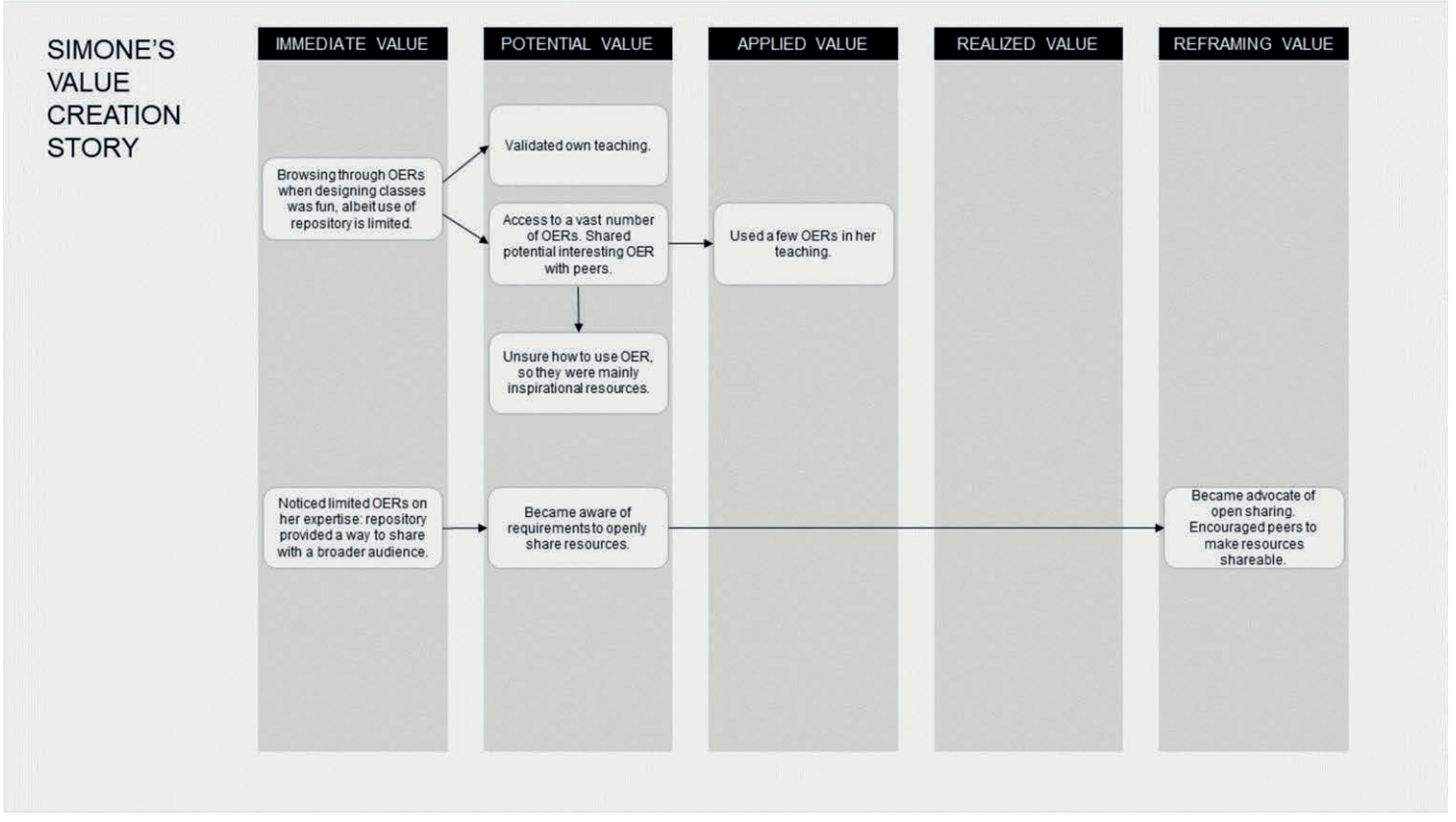


Figure 5.6

*Value creation story of Dafne*

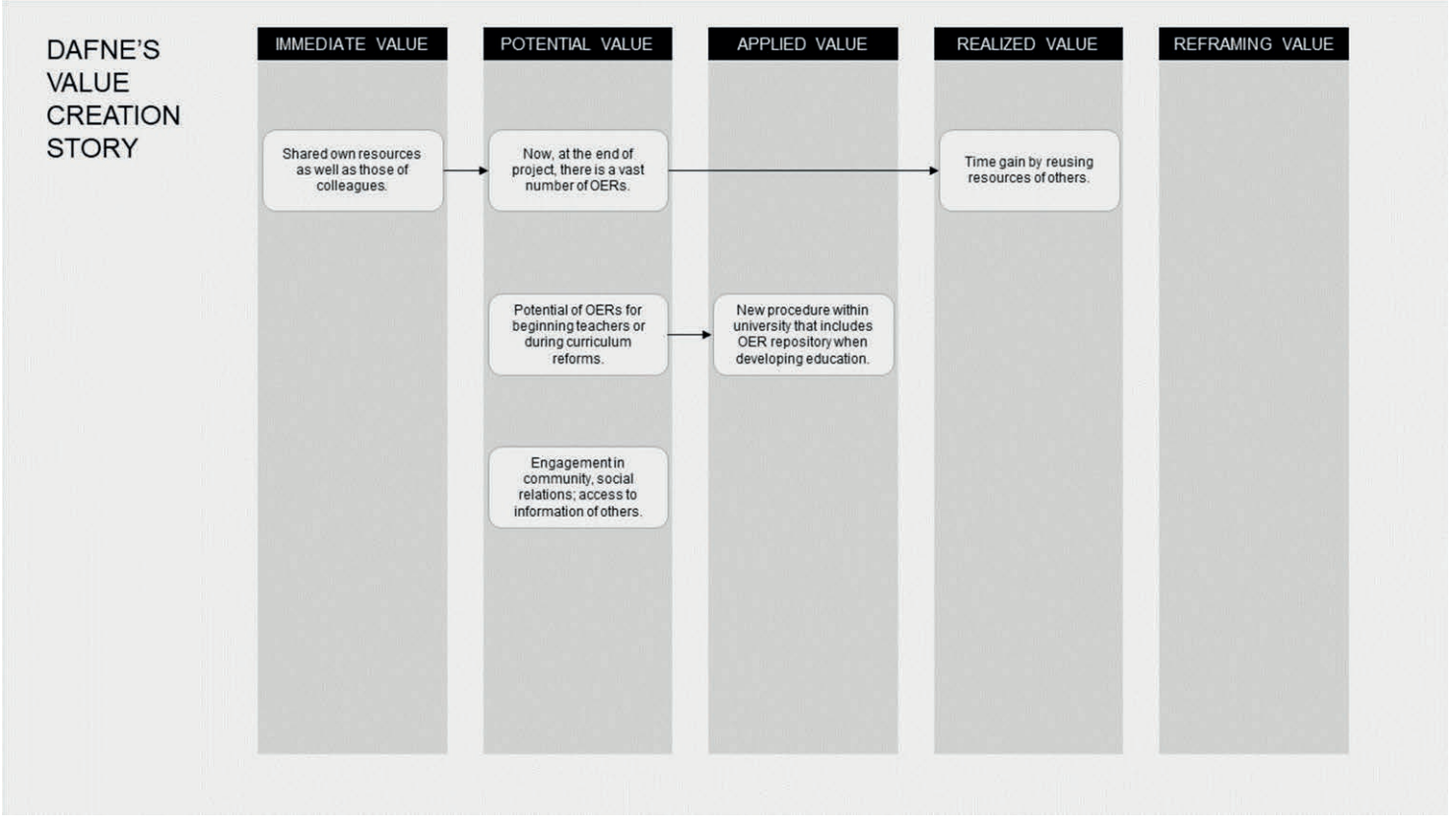
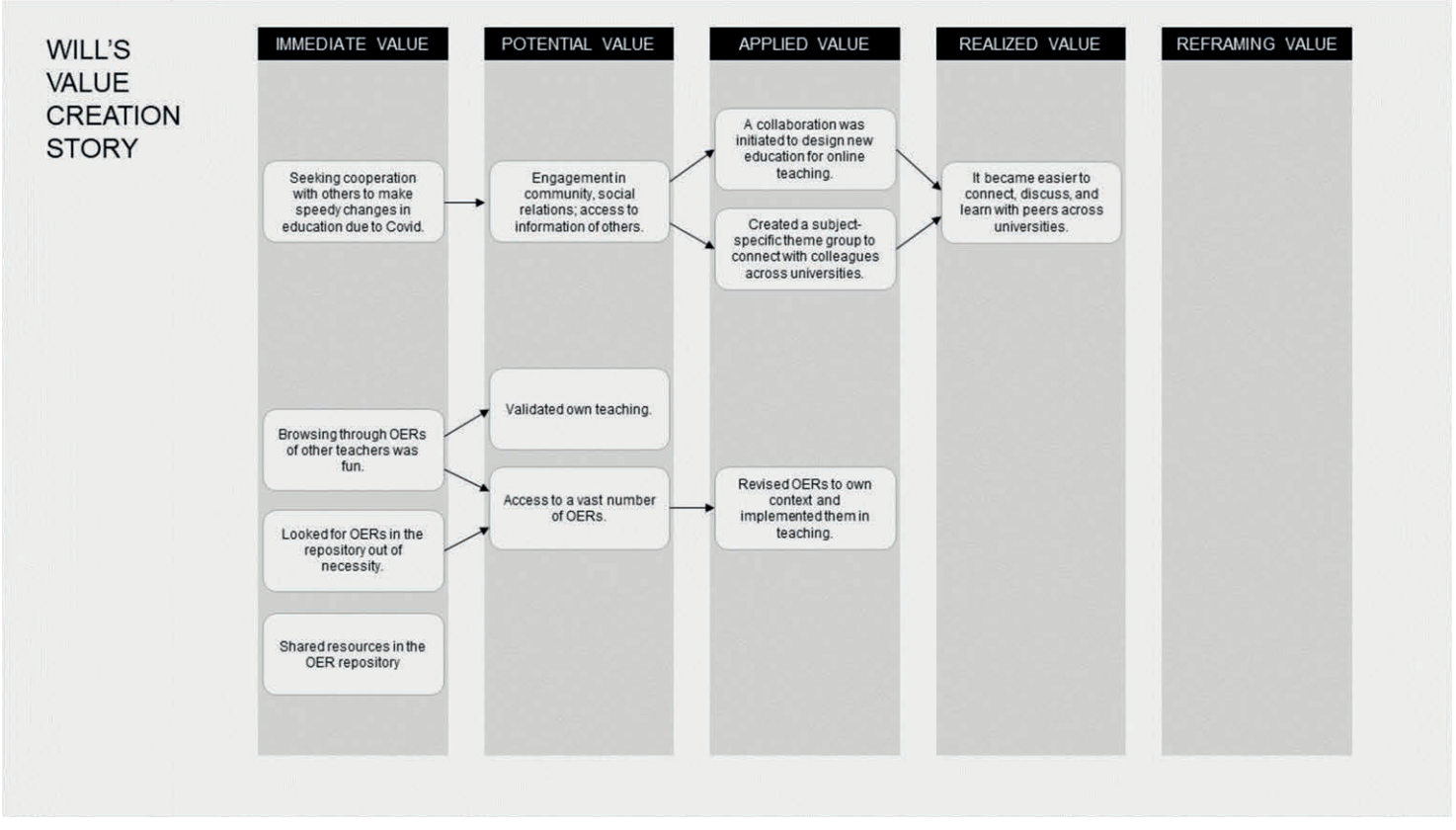


Figure 5.7

*Value creation story of Will*



### Cycle: Immediate value

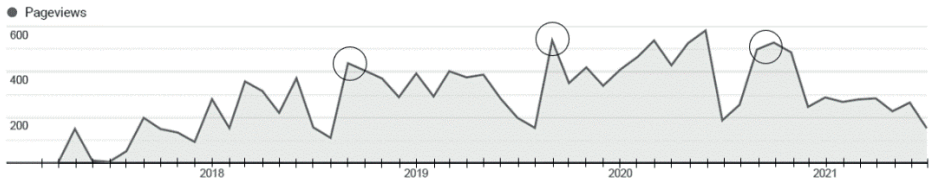
Immediate value is about 'networking/community activities and interactions as having value in and of themselves' (Wenger et al., p. 19). We first present the findings based on the quantitative data, after which we elaborate on the qualitative findings.

*Quantitative data*

An indication of immediate value of the repository can be derived from the user statistics. The pageviews of the OER repository homepage, for example, show an increase of online traffic, despite the high and lows, between 2018 and mid 2021 (see Figure 5.8). Traffic was relatively the highest at the start of each academic year (see added circles), and during the lockdown period in Spring 2020. After the end of the project in November 2020, pageviews appeared to have declined and stabilized.

**Figure 5.8**

*Pageviews of the homepage of the OER repository (circles added)*

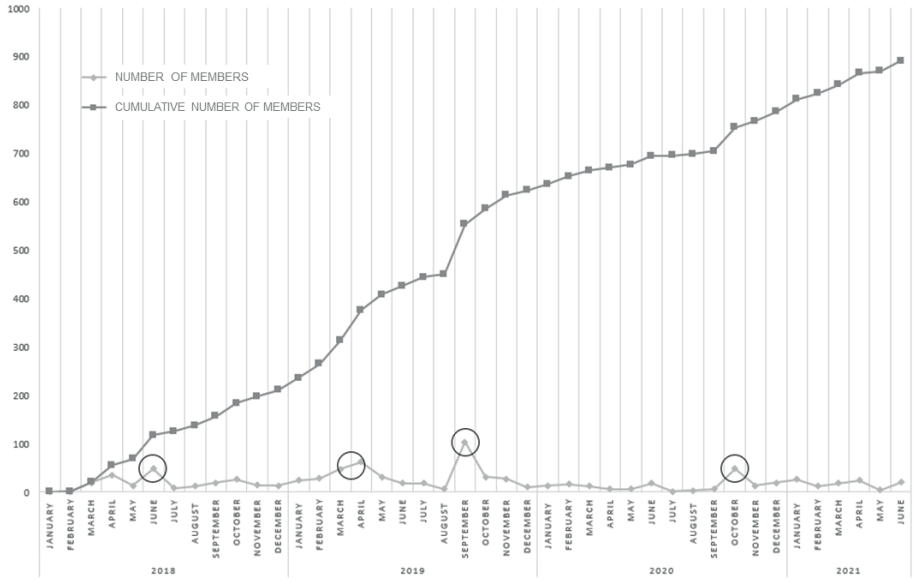



In the questionnaire, teachers (n=65) characterize their usage of the repository mostly as very occasional (47.7%) or occasional (23.1%). Teachers can share and search for resources. In July 2021, a total of 1458 resources were shared in the repository, including third parties resources.

In addition of the value of the repository, an indication of the immediate value can also be derived from the user statistics of the online community. Since the start of the project in 2018, the number of community members gradually raised to a total of 891 users in July 2021 (see Figure 5.9). The data show (see added circles) that the month after the start of the project (June 2018), Spring 2019, and the start of the academic years in 2019 and 2020 had the highest increase of new members. The number of new members continued to increase after the end of the project in November 2020.

Teachers characterize their use of the online community (n=64) in the questionnaire as very occasional (51.6%) and occasional (26.6%). With respect to activities undertaken in the online community, about half of the teachers stated that they had joined a theme group (n=30) or looked for specific information (n=20), whereas about a third indicated that they had created (n=19) or responded to a post (n=19).

**Figure 5.9**
*Growth of members of the online community*



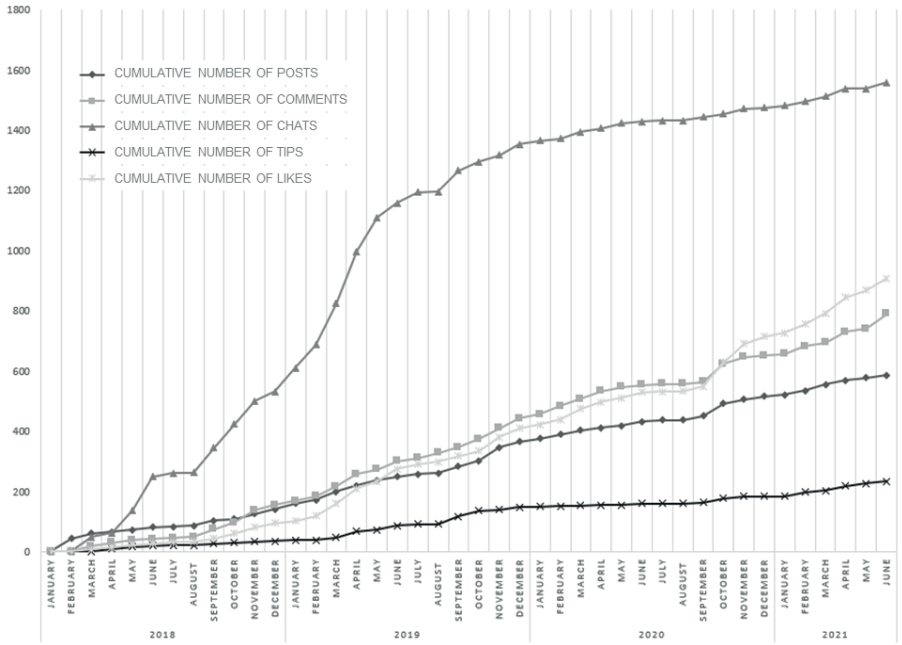

If we investigate the user statistics of the online community it is apparent that activity gradually increased between January 2018 and July 2021 (see Figure 5.10), in line with the increase of new members. In total, online community members created 586 posts and received 789 comments and 907 likes. Teachers could also send a person or a group a so-called tip to draw someone's attention to a post, which was done 234 times. The highest number of activities relate to the chat messages: the online community groups sent 1557 chat messages. Interaction within the online community continued after the official project ending late 2020.

*Qualitative data*

A common view amongst teachers was that the repository provided them with a welcome opportunity to browse through resources of peers, as became visible in their answers on the open response question relating to the repository (n=31) and in the interviews (n=4). Some teachers also stated that the exploration of these resources led to an ancillary value of validation of their teaching approaches. For example, Simone explained that: '[…] you see a lot of familiar things and you think, yes, that doesn't contribute anything, that's how we do it too. So it can also be valuable to be acknowledged for that what you do, you do well.' Another value came up in the interview with Will who explained that the repository also served to face a sudden unexpected challenge when 'I suddenly had to take over a class of a colleague, […] and then I had to familiarise myself [with the content] and think of resources that I could use in my teaching'. With regards to sharing resources, a variety of perspectives were expressed. Teachers valued that they could share their

resources with a broader audience than just their own students; increase the number of resources on topics that were underrepresented in the repository; and showcase their resources.

Figure 5.10
*Activity within the online community between January 2018 and July 2021*




Nevertheless, despite the perceived value of the repository, two concerns were expressed regarding searching OER in the repository. First, several teachers felt that searching and sharing OER was time sensitive and difficult, because finding *the* OER proved to be challenging. Second, there were some negative comments about the quality of the resources as it was experienced that numerous resources were either too context specific (e.g. includes school-specific information) or too narrow (e.g. small assignments without instructions).

With regards to the online community, teachers' answers on the open-ended question relating to the value of the online community (n=18) and the interviews (n=4), showed the value of connecting with peers across institutes. Many of the teachers indicated that they used the online community to ask questions, to receive tips, to connect, or to get help with a challenge. For example, in the interview with Dafne, she emphasized this value by explaining that a colleague of her: 'really appreciated that he had a network of people. […] At our institute, there are only three of them I believe, so then it is really great to see what others are doing.' Marisa mentioned that she used the online community to initiate a school visit to learn more about an educational tool: 'I knew about an institute that had

created a [tool] at the time. […] and then we had a chat about that and when I planned to visit the institute, […] I said to the other institutes "I'm going there on Monday, do you want to come too?"'.

### Cycle: Potential value

The OER community can also produce value that is not immediately realized when the value 'lies in its potential to be realized' (Wenger et al., p. 19). Potential value can be distinguished in five subcategories: tangible capital, human capital, social capital, reputational capital and learning capital. Findings on each of these categories are presented except for learning capital, because we did not identify this in the data.

*Tangible capital*

In the questionnaire, several statements related to tangible capital, which is the access to resources. More than half of the participants (60.0%) agreed with the statements that they know how to search for resources. A small number of teachers indicated that they cannot find resources that are relevant (18.4%) or of good quality (10.8%). These concerns were also expressed in section 4.2.2.

However, the qualitative data showed that the potential value of this access to resources is significant. In the open-ended question relating to the repository (n=31) and the interviews (n=4), almost all teachers mentioned that it provided them with an excellent way to access other's resources. It was suggested that this value increased due to the Covid-19-pandemic, because it required teachers to transfer to online teaching and blended learning. For example, Marisa explained that students miss their peers and 'now we are thinking […] to work with learning communities to foster the group cohesion in a different way. Then you have to come up with a lot more small assignments and then I see that there are resources available in [the OER repository]'. A small number of the teachers also signalled the potential value of the repository for future curriculum reforms. Dafne for example, explained that: 'next year a curriculum reform is on the agenda, so I think we will definitely make colleagues enthusiastic about [the OER repository] […].'

*Human capital*

Yet, a lack of knowledge about what is allowed was an impediment for OER adoption. The data of the questionnaire (n=65) showed that about a third of the teachers (35.4%) did not know under which conditions they may reuse resources. Indeed, this is underlined by the qualitative data, as several teachers mentioned that they would have liked to reuse resources, but did not know what was allowed. For example, Simone said: 'and that's why I didn't use [the resource] as-is, because I didn't know exactly what was allowed. I did use it as inspiration though. That also feels a bit weird, because […] you are using someone else's resource, but I don't explicate that anywhere.'

Overall, teachers argued that the main personal value was the inspiration that these resources gave them. Teachers learned new educational tools, got ideas

of ways to present their teaching content, gained insights what other institutes were teaching, or learned about other pedagogical approaches. Some teachers took up new perspectives about education as they alluded to the notion of online learning as a sustainable component of future education. They experienced that this inter-institutional collaboration enabled them to choose from a plethora of resources that can support this transition to online learning. A few teachers reported that the access to resources made them feeling competent. Commenting on this, one teacher in the questionnaire explained: 'the realisation that I'm not doing so badly after all. I still find it "scary" to share something. My own insecurities. I will stop that.'

*Social capital*

The potential for relationships and connections is considerable, because from the qualitative data (open-ended question relating to the online community (n=18) and the interviews (n=4)), it became clear that all teachers acknowledged the potential to connect with peers from other institutes as a major asset. Their view was that sharing developments and issues and connecting with teachers within the same subjects across institutes is invaluable. For example, Dafne mentioned: 'I would say that one plus one is three. That if you share, you end up with more. That is also why I am enthusiastic about it; two people know more than one.' A small number of teachers stressed that the current community is not yet mature enough. As one teacher in the questionnaire stated: 'it has the potential to be a great asset as it makes it easy to connect with colleagues that focus on the same subject and to learn from each other. Though, it is not yet used enough and is it too quiet to be a proper community.'

*Reputational capital*

In the interviews, Marisa reported that the inter-institutional community provided her with a potential of a collective voice for action. She, for example, emphasised that it offered a voice to put forward the development of much-needed resources because: 'it is absurd that I work with a [tool] in the hospital and [it is used] in every health care organization, but that we don't have it in education. So, this was such a pressing matter that we thought, that has to be implemented straight away.'

### Cycle: Applied value

This value cycle focuses on 'adapting and applying knowledge capital in different contexts [that] can lead to changes or innovations in actions, practice, tools, approaches, or organizational systems' (Wenger et al., p. 20).

One of the expected changes in practice relate to the use of OER. Indeed, the quantitative data showed that reuse had occurred, albeit limited. From teachers' response on statements relating to reuse of OER (n=63), only a few teachers used resources, either with (15.9%) and without (6.3%) adjusting it. Another statement related to the use of the quality mark that was provided as a tool to advice teachers about high-quality resources. However, of the users of the repository (n=65), only a small number of teachers had used this mark when searching for OER (15.4%).

Nonetheless, the open-ended question answers (n=31) illustrated that the teachers who adopted OER were positive about its impact. One teacher reported that it provided: 'great assignments, resources and tips […]. I regularly use parts of existing resources and revise them where necessary for my own lesson. [The OER repository] is of value for new lessons where our school does not yet have any resources available.' This was echoed by the teachers who were interviewed as Marissa, Simone and Will all have adopted OER in their teaching. And although Dafne did not make any changes in her practice, she explained that some organizational structures within her institute were changed to foster OER adoption. She made clear that 'the curriculum committee has a procedure for the development of new education which states that [teachers] should first look in [the OER repository] before we start to develop.'

Another recurrent theme in the interviews was a sense of collegiality. They mentioned an increased awareness of the fact that colleagues might encounter the same issues or have similar desires. Talking about this, Will explained that students were not able to travel abroad due to Covid-19, so an alternative program had to be designed on a relatively short notice. He used the online community to connect across institutes and now teachers from several institutes are 'explor[ing] whether we can create an alternative program for students […]. And then it is nice to be with a group of people that share the same professional background and who can think along in potential good assignments.'

### Cycle: Realized value

In the previous section, we presented teachers' changes of their practice, but these changes do not necessarily imply improvements. Realized value explores 'what effects the application of knowledge capital is having on the achievement of what matters to stakeholders' (Wenger et al., p. 21). Two themes related to improvements were identified in the open response questions and the interviews. First, teachers mentioned that it became easier to approach and connect with teachers from other institutes to ask questions or to share and discuss issues. For example, Marisa explained that the community 'is a very direct way of talking to people and meeting them. And that others say "I have heard that this or that institute is also working on it" and before you know it, you have another email address that you have access to.'

The second aspect of improvement relate to the increased power that the inter-institutional OER community has provided teachers within their institutes. Marisa reported that it offered her a platform to initiate a new collaboration between various institutes to create OER for skills that are vital in students' future profession, but that are not a part of the curriculum. She explained this increased power by saying: 'it is often the case that things are developed from a theoretical point of view, but then it is debatable whether it has any real added value in the primary process [of teaching]. Whereas now, I notice that the gap between theory and practice closes somewhat because the needs are positioned lower in the primary process.'

### Cycle: Reframing value

Reframing value refers to 'a reconsideration of the learning imperatives and the criteria by which success is defined' (Wenger et al., p. 21) which can occur on individual, collective, and organizational levels. In the interviews, we identified two reframing values, both on a personal level. The first example is Marisa who redefined her perception of reusable resources. She clarified that when they were encouraged to upload OER, she started to think about 'what are good resources to share? And only then did I get a more critical view of what I do and do not use'. The second example is Simone who became an advocate for open sharing. As she became more acquainted with the requirements of open sharing, she pro-actively approached colleagues to point out what should be improved so that the resource could be shared in the repository.

## DISCUSSION AND CONCLUSION

This convergent mixed-methods study was set out with the aim of providing insights into value creation in an inter-institutional community on OER in higher education. Previous studies have examined the initiation and the realization of such communities, but our understanding of the value that teachers ascertain to their engagement with communities on OER is limited. Yet, the insights thereof may help to expand our knowledge of increasing value creation in OER communities so that teachers continue to engage with them. Hence, we applied the value creation framework of Wenger et al. (2011) to illuminate 'the added value *for* community members as defined *by* community members' (Dingyloudi et al., 2019, p. 217).

### Teachers' perceived value: what's in it for me

The findings of our study illuminate that value, traversing all five value cycles, was created in the OER community. By combining data, an account of teachers' experienced value creation could be formulated. A main finding to emerge from the analysis is that major value creation occurred from teachers' personal needs, resulting in dominant immediate and potential values. Teachers experienced value because their participation in the inter-institutional community resulted in access to resources, inspiration, connections with peers, or aid during emergency teaching. The repository provided teachers with access to relevant resources that they could use in their own teaching, either when designing a lesson, for some last-minute changes, or during curriculum reforms. Teachers especially mentioned the value during the school closures during the Covid-19-pandemic, which might be obvious because teachers had to suddenly switch to online education. OER communities, therefore, not only provide value and support in teachers' day-to-day practices, but also in crisis situations (see also Zaalouk et al., 2021).

In this study, two loosely coupled platforms operated as the foundation of the OER community: teachers could find and share resources in the *repository*, and they could connect, ask questions, or discuss practices with peers in the *online community*. We underline the necessity of collaboration-supporting technology because it transcends space and time to connect institutes across their physical

borders, but it also enables institutes to include elements of work practices (e.g. standards, cultures) into school practices (Mavri et al., 2021). The latter is especially relevant for some programmes of higher education institutes because more emphasis is placed upon creating authentic learning environments at the school-work boundary to better prepare students for occupational practice (Bos, 2022; Bouw et al., 2021).

OER communities might facilitate boundary crossing across institutes (Baas et al., 2023a). Findings on applied and realized value denote that it became easier for teachers to connect with peers, and to initiate collaboration projects across institutes, because boundaries between institutes had diminished. Indeed, all four boundary spanning mechanisms that foster the connectedness between institutes (Hawkins & Rezazade, 2012) were employed within the context of this study: boundary objects (e.g. OER), boundary spanning (e.g. brokers), boundary discourse (e.g. teachers' conversations in the online community), and boundary practice (e.g. initiation of collaboration across institutes). Yet, Hawkins and Rezazade (2012) emphasize that these spanning mechanisms evolve over time. This could explain why less realized and reframing values were identified in our data on this beginning community, in line with previous studies (Booth & Kellog, 2015; Forbes, 2020; Van Waes et al., 2016). In our case, it could be that it was too early to discern these values because teachers were still getting acquainted with the community, which might take longer to transpire. It could also be that teachers do not yet articulate these values, as it requires them to reflect upon abstract notions and phenomena of success (Dingyloudi et al., 2019).

### Value creation to inform sustainable practices of inter-institutional communities

We present three practical recommendations that could support communities on OER to cultivate sustainable practices. These recommendations relate to the sustainability of (1) the community's aspirations, (2) the connection of it with the wider organization(s), and (3) OER adoption.

First, the value creation as defined by its members can not only be an inspiration for its members but can also inform community managers and higher education institutes to further sustain the community by designing supporting activities and practices (Wenger et al., 2011). For example, in our study most value was created in the immediate and potential value cycles. Although values are not mutually exclusive, changes in their practice remained constrained compared to the aspirational narrative of the community (see paragraph 'Research context'). We recommend that communities use the framework to look forward and examine how further value creation can be promoted. For example, within this context, community leaders can decide to commence actions that encourage teachers to experiment with OER in their teaching practices. To stimulate such a change, it is important to create an awareness of the broader change process including the transition from traditional teaching practices to open teaching practices (Schophuizen & Kalz, 2020).

Second, in line with the first recommendation, it is vital that the value creation of the community is in line with the developments within the wider organization(s). If there is no alignment with burning issues of the organization(s), the community will still have value for its members, but there will be no or limited managerial support (Büchel & Raub, 2002). Büchel and Raub argue that without management support, sustainable practices in which members learn from each other simply cannot evolve. A key priority for communities should, therefore, be to connect and align its narrative with the wider organizational structures, visions, and issues, thereby aiming to extend the initial lifespan of the project. It could be helpful to repeatably and frequently assess value creation, and to use this information to further cultivate the community (Wenger-Trayner et al., 2019).

Third, we suggest that OER communities include teachers' expectations and demands regarding OER when cultivating the community. Many OERs were shared within the context of this study, however, reuse remained limited. Despite the development of a quality model, it appeared that quality remained an issue for some teachers: OERs were perceived as not suitable as they were either too context-specific or too small. This relates to the juxtaposition of reusable resources; better known as the reusability paradox (Frantiska, 2016; Wiley, 2002). The reusability paradox describes that 'if a [resource] is useful in a particular context, by definition it is not reusable in a different context. If a [resource] is reusable in many contexts, it is not particularly useful in any' (Norman, 2003). This paradox means that if someone is designing an OER, they have to make the choice to either create an OER with little context in it that is easier to reuse but requires more of the users to personalize and contextualize; or to create an OER with much context in it, which better supports learning but also limits reuse. In the context of this study, a quality mark was developed to support teachers in designing OER as well as to find quality OER. Although this quality mark indicates a certain quality standard of a resource, the value of an OER still remains a personal assessment. To foster OER adoption, Baas et al. (2023b) suggest that conversations on OER in teacher teams might be a promising method. We recommend communities to organize such conversations, in which we stress the importance to include the support of librarians and instructional designers. Although OER in the current study were already context-specific (i.e., nursing education), they still need to be localized and personalized to align it with the teacher's specific content and context (Hood, 2018). Especially support from instructional designers is needed because the pedagogical effectiveness of OER in practice does not only relate to the reusability of a resource, but also to the revisability of it to effectively support the student's learning journey (Sandanayake, 2019; Wiley, 2020).

### Limitations and future research

This study has some limitations that must be addressed. First, we were able to interview four teachers who made use of the community, but all four of them were highly experienced teachers. Although we invited novice teachers as well, we failed in this due to the implications of Covid-19-pandemic on nursing education teachers'

teaching and healthcare obligations. Future research could therefore explore if and how value creation within communities on OER might differ for experienced and novice teachers, because experienced teachers have, as opposed to novice teachers, the means to actively shape their interactions to create realized and reframing value (Van Waes et al., 2016).

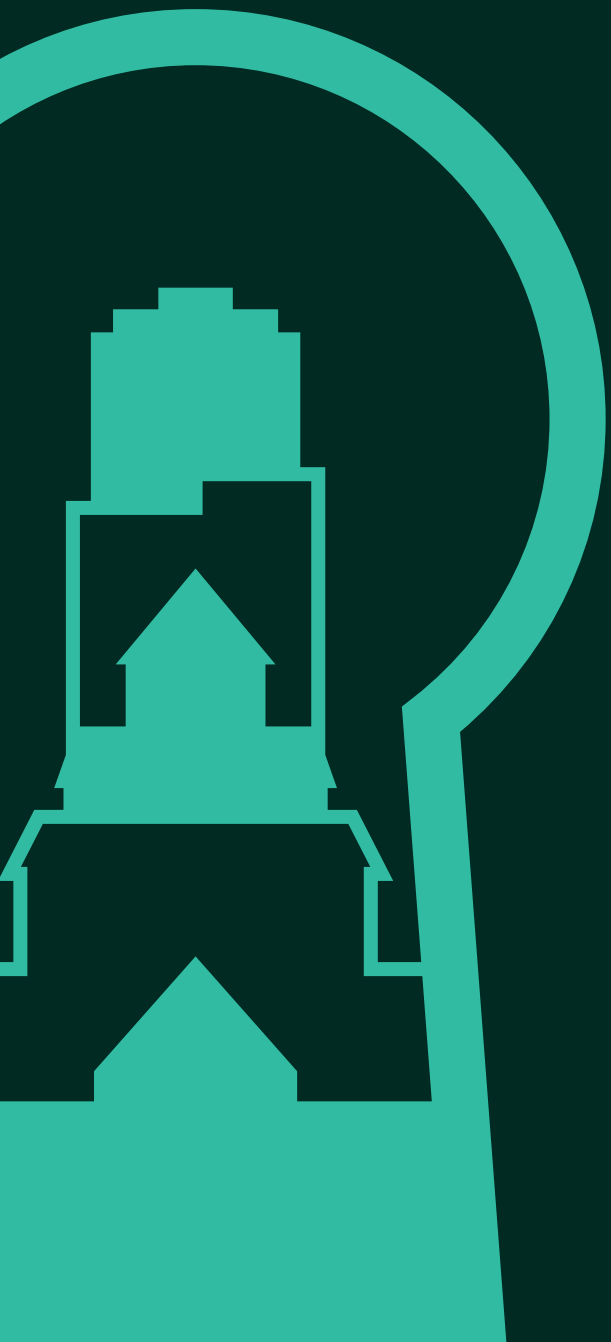
Second, future longitudinal research can deepen our understanding what is needed to mainstream OER. Our findings, based upon one single data collection moment, indicate that a community-approach might be a promising way to foster continuous engagement of teachers. This may lead to sustainable communities, but value creation must be actively nurtured throughout the evolution of the community. Longitudinal research could deepen our understanding how value creation changes over the life of a community (Wenger et al., 2002) and whether networks, collaborations, and alliances in higher education differ in this (Williams, 2017).

Third, we acknowledge that value creation might be different for other settings and other types of communities. This study was conducted within a specific context: teachers were voluntarily engaged in the inter-institutional community, and there were no set objectives, structured activities, process facilitators, or face-to-face moments through which we could relate teachers indicated value creation to certain activities or actions. The value creation framework yielded us with important understandings of the value that is created by the community on OER, but we also encountered some challenges, especially related to the allocation of value cycles to data fragments. We therefore agree with Booth and Kellog (2015, p. 695) that 'while the distinctions [between value cycles] can easily be understood conceptually, teasing out these distinctions within stories occasionally provide challenging.'

## Concluding remark

This study emphasizes the importance of exploring value creation in an inter-institutional community on OER, and that the framework we used is helpful to inform actions to further promote value creation. Within this process, it is vital to connect the activities and connections that teachers deem valuable, the 'what's in it for me', with the burning issues of the organisation(s) to promote sustainability.

# 6



# 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 tamp 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 collaborative 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 being 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' determinator 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.

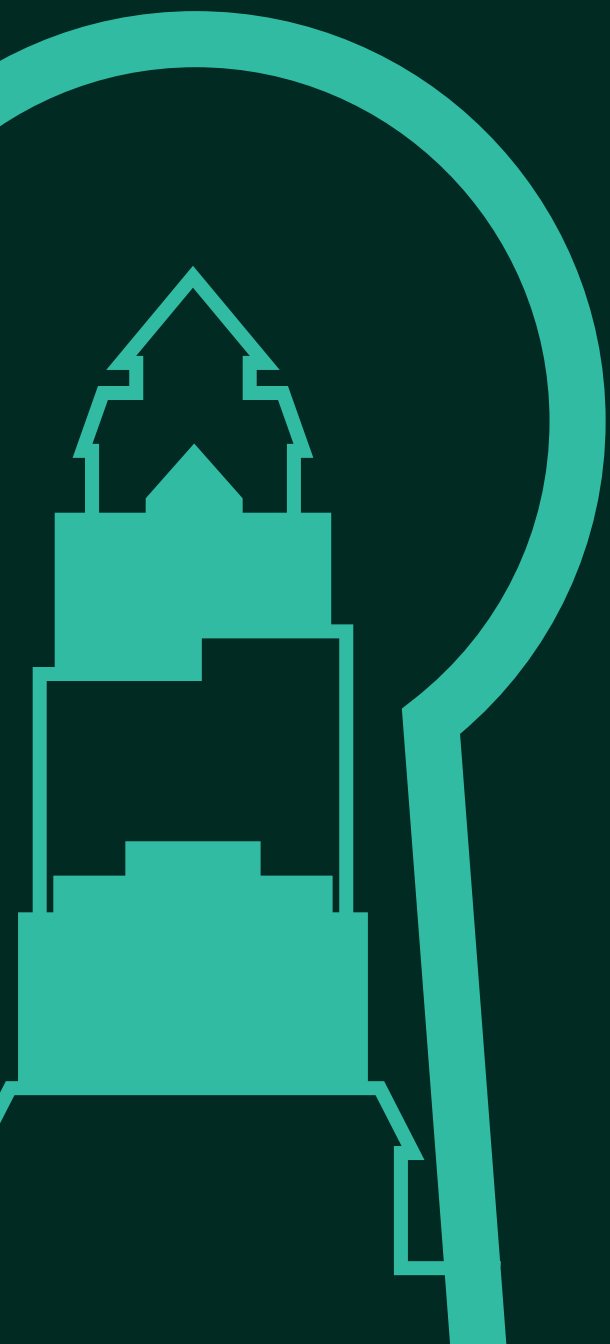
### OER as an element of open pedagogy to stimulate meaningful learning

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'.



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# Appendices

## APPENDIX A. Questionnaire (study 1)

More and more educational resources are being developed by teachers across the globe. Sharing and reusing (educational) materials within our institute, but also in close collaboration with other institutes, can be helpful when designing and teaching education. We would like to gain insights into the extent that sharing resources with others is already happening. And more specifically, we are also interested in your opinion on the use of resources created by others.

With the results we will determine how we can support the sharing and reuse of educational materials within our institute. We would therefore greatly appreciate it if you would fill in this questionnaire. This survey takes about 5 minutes to complete.

The main results will be shared within your school 6 weeks after the closing date of this questionnaire.

---

What do you know about this logo?


- o I've never seen it
- o I've seen it but I don't know what it means
- o I've seen it and I know what it means

---

The logo you have just seen is a Creative Commons license and is often used to indicate what rights you have as a user when (re)using Open Educational Resources.

Are you familiar with the term Open Educational Resources?
- o No, I'm not familiar with Open Educational Resources
- o I have heard of OER
- o Yes, I'm familiar with Open Educational Resources

---

*Display these questions: If answer on previous question is (2) or (3)*

Have you used open educational resources in the past academic year?
- o Yes
- o No
- o I don't know

Did you share your own educational resources with colleagues in the past academic year? (inside and/or outside the institute)
- o Yes
- o No

*Display this question: If answer on previous question is Yes*

How did you share these resources with your colleagues?
- o Without any kind of rights
- o With copyright for me
- o With copyright for the institution
- o With an open license
- o Other, namely ……

---

Below are 10 statements on the use of open educational resources in education. You will be asked to indicate to what extent you agree or disagree with the statements.

But first to clarify, OER are learning, teaching and research materials that reside in the public domain or are under copyright but have been shared with an open license. It permits no-cost access, re-use, re-purpose, adaptation and redistribution by others.
[image with an example of an OER, including creative commons logo]

*On a scale of 1 = strongly disagree to 5 = strongly agree*

1. The (re)use of OER saves time
2. I know where I can search for OER
3. I have sufficient expertise to assess the quality of OER
4. It is difficult to find OER of sufficient quality
5. I rather use OER which are recommended by someone I know and trust
6. I rather use OER by an author or institution with a good reputation
7. It is quite easy to adapt OER so that it meets my requirements
8. I wonder if I have enough skills to use OER effectively
9. I have sufficient knowledge to implement OER in my curriculum
10. I think I can learn to use OER fairly quickly

---

To conclude, we ask you to indicate which, if any, of the following types of educational resources you have used last academic year. Choose a frequency between 1 = never (not all all) to 5 = often (at least several times a month) in the first column. Indicate the origin(s) of these resources in the second column. Options of origin include publisher, self-developed, colleagues, internet, open license (e.g. Creative Commons), or commercial. Multiple options are possible.

| Type of resources | Frequency of use (on scale 1 to 5) | Origin resources (selection from options) |
|---|---|---|
| Pictures, photos, infographics | | |
| Presentations | | |
| Video or audio fragments | | |
| Assessments | | |
| 'Knowledge clips' | | |
| Rubrics | | |
| Peer-feedback | | |
| Portfolios | | |
| Lectures | | |
| Elements of a course | | |
| Whole course | | |
| E-books | | |
| Data sets | | |
| (Educative) games or simulations | | |
| Other, namely | | |

We finally, ask for some demographic data.

How much teaching experience do you have in higher education?
- o 0-2 year
- o 3-5 year
- o 6-10 year
- o 10 year

What is your age?
- o ≤ 25 year
- o 26-35 year
- o 36-45 year
- o 46-55 year
- o 55 year

What is you gender?
- o Man
- o Woman
- o Other

**APPENDIX B.** Overview of OER for each subject that were assessed (study 2)

| Subject | No | Type | Title | Provider | Link |
|---|---|---|---|---|---|
| Business Analytics (BA) | 1 | OT | Introductory Business Statistics | OpenStax | https://openstax.org/details/books/introductory-business-statistics |
| | 2 | OOC | Open and Personalized Statistics Education | Utrecht University | https://www.uu.nl/onderwijs/open-en-gepersonaliseerd-statistiekonderwijs/lesmateriaal |
| | 3 | OT | Beginning Excel | Open Oregon Educational Resources | https://openoregon.pressbooks.pub/beginningexcel |
| | 4 | OCW | Data Analysis: Take it to the MAX | TU Delft OpenCourseWare | https://ocw.tudelft.nl/courses/data-analysis-take-it-to-the-max/ |
| Intercultural Communication (IC) | 1 | OCW | Professional Communication | Olds College in collaboration with the Government of Alberta | http://www.procomoer.org/ |
| | 2 | OT | Intercultural Learning. Critical preparation for international student travel | University of Technology Sydney | https://epress.lib.uts.edu.au/books/intercultural-learning |
| | 3 | OOC | English for Media Literacy | University of Pennsylvania | https://www.coursera.org/learn/media?sitelD=SAyYsTvLiGQ-YF.eVw.fP0MyTilN9z66vA&utm_content=10&utm_medium=partners&utm_source=linkshare&utm_campaign=SAyYsTvLiGQ |
| Research Methods (RM) | 1 | OOC | Open and Personalized Statistics Education | Utrecht University | https://www.uu.nl/onderwijs/open-en-gepersonaliseerd-statistiekonderwijs/lesmateriaal |
| | 2 | OT | Choosing & Using Sources: A Guide to Academic Research | Ohio State University Libraries | https://open.umn.edu/opentextbooks/BookDetail.aspx?bookId=333 |
| | 3 | OCW | Videos of Qualitative Research Methods | University of Amsterdam | https://www.coursera.org/learn/qualitative-methods/home/welcome |
| | 4 | OT | Introductory Statistics | OpenStax | https://cnx.org/contents/MBiUQmmY@20.1:2T34_25K@11/Introduction |

## APPENDIX C. Context in which the brokers are operating (study 3)

To foster the transition from the historical system to the desired system, a temporary activity system was set up to achieve sharing and reuse of OER within an active professional community of teachers across institutes. In this appendix, we provide a detailed account of this temporary activity system in which the brokers (subject) were operating.

*Object and Outcome*
The object 'refers to the "raw material" or "problem space" at which the activity is directed' (Engeström & Sannino, 2010, p. 6). The object of the temporary activity system was: (a) to expand involvement in the sharing and reuse of high-quality OER and participation in the online community to teachers across all 15 institutes; and (b) to create structures and conditions to foster the sustainability of the collaboration after the project period. This should ultimately lead to the outcome of high-quality education.

*Instruments*
The brokers used mediating instruments to achieve the object. An OER repository was made available for which a subject vocabulary was developed so that searching, finding and uploading would take place under standardized and recognizable terms. If OER met the requirements as outlined in the quality model, a quality label was given as a seal of approval. This made it easier for teachers to quickly find the right materials of guaranteed quality. In addition to the repository, an online professional community was available for teachers. The aim of this community was to provide teachers with the opportunity to connect, discuss OER and practices or identify the need for new OER. New OER were created by the core institutes based on teachers' needs. To raise awareness of both the repository and the online community, PR resources were available. Additionally, professional development activities took place, since creating, sharing and using OER entails expanding the traditional role of teachers.

*Rules*
The rules refer to the explicit and implicit regulations and standards that constrain actions (Engeström & Sannino, 2010). Several rules were imposed in this project and all institutes committed to follow them when agreeing to participate in the project:

- A quality model had been developed and adopted. This model provided teachers with guidelines to optimize the quality of their own resources while it also provided them with the confidence that the OER in the repository were of high quality.
- A total of 1900 OER would be shared in the repository, all described in accordance with the quality model. Resources did not necessarily have to originate from the institutes, OER from third parties were shared as well (referatory).
- All resources were to be shared under a Creative Commons license.
- A total of 40 new OER would be developed by the core institutes. Objectives were for two or more institutes to co-create new OER by remixing with existing OER if possible.
- The aim was to realize an active community of practice in which approximately 500 teachers would take part.
- Frequent evaluation moments took place through process reports to discuss progress and possible issues within the institutes.

*Community*
The community is defined as consisting of all involved who share the same object. The potential community of this activity system consisted of all (approximately 2500) teachers within the 15 institutes. The institutes are united under the umbrella of the National Consultation on Nursing Education (LOOV). Collaboration was sought with the professional nursing association. Towards the end of the project, healthcare professionals were approved to participate to create interaction between institutes and the healthcare profession.

*Division of labour*
Division of labour relates to the 'horizontal division of tasks and vertical division of power and status' (Engeström & Sannino, 2010, p. 6). The activity was organized according to the division of labour distributed across all 15 institutes, although the core institutes had more responsibilities than the project institutes. Within the institutes, management had given their commitment to the project. The brokers acted as the link between the project system and the institute. The project manager had the coordinating role in the project by monitoring progress and disseminating knowledge. The project was overseen by a steering committee which could intervene if progress within an institute stalled. Quality assessors assessed the OER in the repository on the indicators of the quality model and, if the OER complied with them, awarded a seal of approval. A community coordinator was assigned with tasks related to community management. Teachers were supported by support staff (e.g. library, ICT or educational support).

**APPENDIX D.** Brokers' experiences of actions they undertook (study 3)

| Focus of actions | Topic | Description | Remark | Actions | Exemplary quotation |
|---|---|---|---|---|---|
| Encourage teachers | Encouragement and awareness | Actions aimed at creating awareness about the project Together Nursing and encouraging teachers to engage with it | + | ▪ Small-scale meetings<br>▪ Individual approach<br>▪ Relate to teaching content<br>▪ Relate to curriculum reforms<br>▪ Relate to 'what's in it for me'<br>▪ Rewarding and complimenting<br>▪ Respond to covid-19 | *'In the beginning we mainly organized some larger meetings. First meetings within the educational programs, then in the various teacher teams. The more it became individual, in groups of six but indeed also individual like "hey, I'll bring you up to speed, come and sit down" […], the more it became widely supported.'* |
| | | | - | ▪ Large-scale meetings<br>▪ Use of PR posters<br>▪ Mailing | *'Sending out mails and reminder mails. The mails are quickly archived and not looked at again. The topic does not have priority in busy times.'* |
| | Teacher support | Actions aimed at supporting teachers in using the online community and the OER repository | + | ▪ Workshops<br>▪ Lessons<br>▪ Individual support | *'Different team members need different approaches. It also depends on the stage of the process you're in. In the beginning more general workshops and trainings. Later on, the individual approach was more valuable.'* |
| | | | - | ▪ Workshops | *'Workshop with the library on open sharing. Output: colleagues were aware, but [there is] little time and effort to adapt [resources] themselves.'* |
| Use of OER repository | Creation of OER | Actions aimed at the collaborative creation of new OER | + | *No reflective remarks on actions* | |
| | | | - | ▪ Too late involvement of OER designers | *'I think I would have liked to involve the creators of OER earlier on. By doing so, the group becomes a bit larger which provides a bit more power within your institute to enthusiasm more people.'* |
| | Share and reuse OER | Actions aimed at sharing and reusing OER | + | ▪ Relate to teaching content<br>▪ Relate to curriculum reforms<br>▪ Use of metadata form<br>▪ Upload OER for teachers<br>▪ Schedule plenary sessions to share resources as OER | *'Actively searching for beautiful resources in the digital learning environments to share [in the repository]. I would recommend this method to everyone, instead of focusing solely on the quota. It is much more rewarding to look at what colleagues do in their classes and to share the best components with colleagues at other universities of applied sciences.'* |

| Focus of actions | Topic | Description | Remark | Actions | Exemplary quotation |
|---|---|---|---|---|---|
| Use of repository | Share and reuse OER | | - | ▪ Open call to share OER<br>▪ Enforce teachers to share an x number of OER<br>▪ Schedule plenary sessions to share resources as OER<br>▪ Stress the quota of OER to be shared by the institute | *'Require teacher teams to share an x number of resources. Positive result: resources to share, colleagues getting excited about the OER repository and the online community. Negative result: resistance to the entire project.'* |
| | OER Quality | Actions aimed at the adoption of the quality model and corresponding quality label | + | *No reflective remarks on actions* | |
| | | | - | *No reflective remarks on actions* | |
| Use of online community | Cultivation of community | Actions aimed at cultivating the online community within the institute | + | ▪ Relate to 'what's in it for me'<br>▪ Relate to teaching content | *'I think [that] the subject groups that emerge within the online community are perceived as valuable. This can act as a force of attraction. Teachers need to get a clear picture of "What's in it for me? Does it make my job more efficient? Easier? More fun?" Then they'll be willing to participate.'* |
| | | | - | ▪ Lack of face-to-face contact | *'That's what a number of colleagues have passed on, that [they] like to know who they are talking to. That [they] like to have met people as [they] are more inclined to look them up and connect with them in the online community. There is a need to see with who you are collaborating.'* |
| Organizational structures | Within the institutes | Actions aimed at creating the needed organizational structures within the institutes | + | ▪ Collaboration with library<br>▪ Integration into HR interviews | *'A number of preconditions are certainly important, but preconditions are not only a metadata form but also making use of the library for example.'* |
| | | | - | ▪ Limited focus on collective responsibility<br>▪ Organizational pre-conditions not in place on time | *'I think that we could have done a better job of explaining within the team how we would attain the number of open resources. That doesn't take away the fact that everyone was enthusiastic about the project. I think that this […] has been emphasized more than the collective responsibility of sharing resources.'* |
| Organizational structures | Of the project | Actions aimed at creating the intended structure of the project organization | + | ▪ The role of brokers and project manager<br>▪ Quality assessors of OER | *'I think that the broker role, I think that it is a crucial factor. You also need a good project manager, but the broker's* |

| Focus of actions | Topic | Description | Remark | Actions | Exemplary quotation |
|---|---|---|---|---|---|
| | | | | ▪ Enthusiastic individuals<br>▪ Personal enthusiasm | *role is so essential. Yes, […] you need a driving force whom encourages people based upon their own enthusiasm.'* |
| | | | - | ▪ Tedious project meetings<br>▪ Solely focus on institutional commitment<br>▪ Joining project after 1 year | *'What I take away with me for the future is that commitment alone is not enough. The responsibility must be felt and must be implemented in all levels [of the institute] so that when you make agreements, 134 OER, the teachers don't see it as a burden but know that we have to comply with it. And that we have the opportunity to do so, because we have been given the time for it.'* |
| | External promotion | Actions aimed at promoting the project Together Nursing outside the participating institutes | + | *No reflective remarks on actions* | |
| | | | - | *No reflective remarks on actions* | |

*Note. + = positive remarks and - = negative remarks in relation to action*

## **APPENDIX E.** Questionnaire (study 4)

The project Together Nursing is, officially, coming to an end. A festive online wrap-up will take place on October the 30th. Through this questionnaire we want to evaluate how and to what extent the products developed in this project, namely Wikiwijs and the online community hbovpk.nl, are used by teachers. Completing the questionnaire will take a maximum of 10 minutes. Once the results are known they will be shared within the community.

---

What is your age?
- o <26 years
- o 26-35 years
- o 36-45 years
- o 46-55 years
- o >55 years

What is your gender?
- o Male
- o Female
- o Other / I prefer not to disclose

How many years have you been working in higher education?
- o 0-2 years
- o 3-5 years
- o 6-10 years
- o >10 years

---

Did you ever made use of the OER repository?
[image of OER repository visible]
- o Yes
- o No
- o I don't know

---

*Display these questions: If answer on previous question is Yes*

How would you characterize your usage of the OER repository?
*Scale of 1 = very occasionally to 5 = very frequently*

Please indicate to what extent you disagree or agree with the following statements concerning the OER repository Wikiwijs hbo vpk.

*Scale of 1 = strongly disagree to 5 = strongly agree*

1. I know the conditions under which I may reuse resources from [the repository] in my own teaching
2. In [the repository] I can find resources that are relevant
3. In [the repository] I can find resources of good quality
4. I know how to search for resources in [the repository]
5. I use the quality mark to determine the quality of resources in [the repository]
6. I plan to (continue to) use resources from [the repository] in the future

How often did you use or share resources?
*Scale of 1 = never to 5 = very often*

1. I have shared resources in [the repository] or arranged for them to be shared (e.g. by the library)
2. I have used resources of [the repository] in my own education without making adjustments to them
3. I have used resources of [the repository] in my own education with making adjustments to them

Can you give an example how the [OER repository] has influenced your work? What did you gain through your engagement with the [OER repository?]
*[open-ended]*

---

*Display this question: If answer on question 'did you ever made use of the OER repository' is No*

Can you indicate why you are not using [the OER repository]? Multiple answers are possible.

- ☐ I have not looked into it yet
- ☐ I have no need for other educational resources
- ☐ I find the quality of the resources unsatisfactory
- ☐ The resources are not suitable for my teaching
- ☐ It takes too much time to search for relevant resources
- ☐ I prefer not to share my educational resources publicly
- ☐ I don't know how to make my own resources appropriate for public sharing

Other answer? Please enter it here.
*[open-ended]*

---

Did you ever made use of the online community?
[image of online community visible]

- ○ Yes
- ○ No
- ○ I don't know

---

*Display these questions: If answer on previous question is Yes*

How would you characterize your usage of the online community?
*Scale of 1 = very occasionally to 5 = very frequently*

Which activities have you undertaken in the online community? Multiple answers are possible.

- ☐ I have looked around
- ☐ I am a member of a thematic group
- ☐ I have posted a message
- ☐ I replied to a message
- ☐ I have asked a #daretoask question
- ☐ I have visited the OER marketplace
- ☐ I connected with another member
- ☐ I specifically looked for particular information
- ☐ Other, namely ……..

Can you give an example how the online community has influenced your work? What did you gain through your participation in the online community?
*[open-ended]*

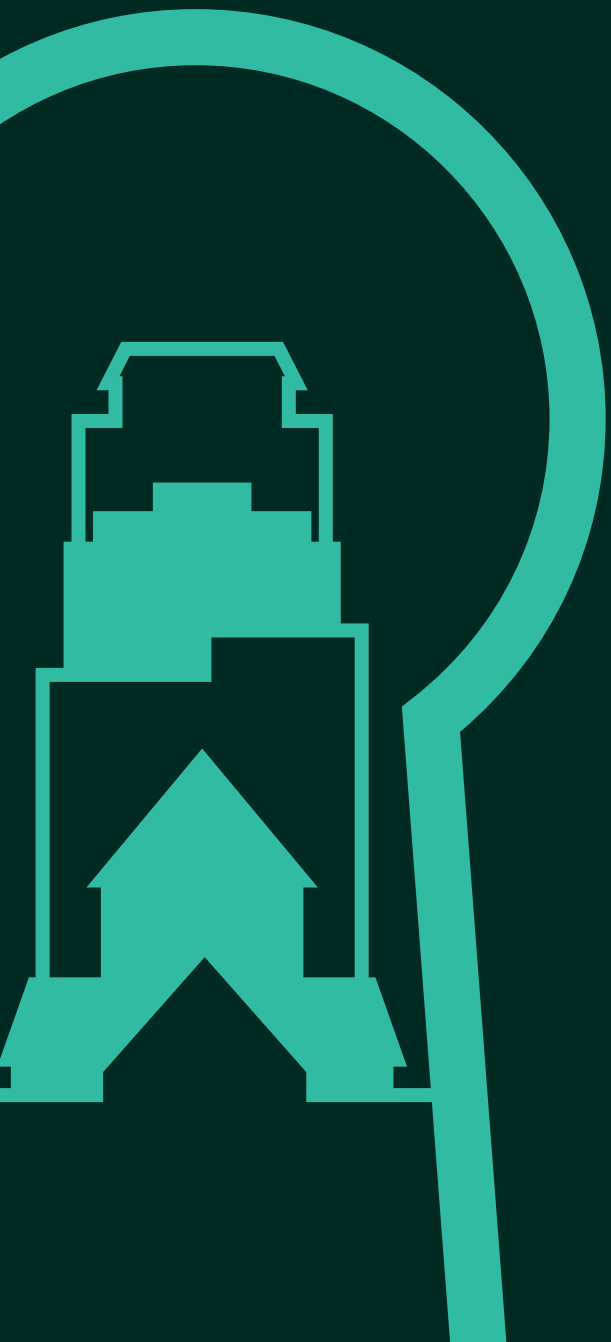
---

*Display this question: If answer on question 'did you ever made use of the online community' is No*

Can you indicate why you are not using the online community? Multiple answers are possible.

- ☐ I have not looked into it yet
- ☐ I do not see the added value compared to my current network(s)
- ☐ It takes up too much time
- ☐ I do not have issues, thoughts, or ideas that I want to share in the online community
- ☐ I do not know whether I can make a valuable contribution in the online community
- ☐ I am not comfortable to share issues, thoughts, or ideas in the online community

Other answer? Please enter it here.
*[open-ended]*



## SUMMARY

Higher education curricula are regularly transformed to stay abreast of the diverse societal, technological, and domain-specific developments. Teachers continuously design, update or revise their curricula to prepare students for this rapidly changing world. To aid students' learning, teachers use a wide range of resources.

Nowadays, many educational resources are available online with open licenses that indicate how they may be reused. These resources are shared by people around the globe and are better known as open educational resources (OER). OER are learning, teaching, and research materials in any format and medium that reside in the public domain or still hold copyright but have been released under an open license that indicates that no-cost access, re-use, re-purpose, adaptation and redistribution by others is allowed. Surely, the difference between a traditional resource and an open educational resource are the OER defining '5R' characteristics: users may reuse, retain, revise, remix, and redistribute the resource. Everyone has the permission to engage in the following '5R' activities:

- Reuse: the content can be reused in its unaltered original format and may be used in a wide range of ways. For example, a teacher may use the resource in their class, in the virtual learning environment, in a video, online, or anywhere else.
- Retain: the content can be retained for personal archives or references. For example, a teacher has the right to download, store, manage, and own copies of the resource.
- Revise: the content may be modified, adapted, adjusted, or altered to align it with the user's specific needs. For example, a teacher may translate the content into another language, only use parts of the resource, or adapt it to their specific context.
- Remix: the content, either the original content or revised content, may be adapted with other content to create something new. For example, a teacher combines their own resources with an OER to create a new resource.
- Redistribute: the content, either in its original format or altered format, may be shared with anyone else. For example, a teacher can freely share copies of the resource with colleagues and students.

In Chapter 1 we further explicated and position the concept of OER within the wider open education movement that aims to move from knowledge as a commodity to knowledge as a commons. For example, most likely every scientist is familiar with concepts like open access, open data, and open science, and every programmer is probably versed in open source software. Concepts like open educational resources, massive open online courses, and open educational practices can all be understood as open education. Open education is not intended to be a substitute for traditional higher education, but it aims to provide learners free access to resources throughout their lifelong learning.

Indeed, for students one primary advantage of OER relate to having free access to resources. This is pivotal to expand access to higher education. Another advantage is that OER can increase the variety of the resources students use to support their learning process. Different pedagogies, different modalities, or just seeing other examples are reasons why students often look for additional resources. For teachers, a key advantage of OER is that they can reuse OERs rather than start from scratch when designing or revising curricula. It allows teachers to customize resources to align them with their specific context. For example, a teacher can decide to use only parts of a resource (e.g. only use one chapter of a textbook), to revise a resource to better illustrate their specific context (e.g. to add content or include diversity), or to mix OERs with other resources to enhance the course content for students (e.g. to provide differentiation).

Nowadays, over two billion resources are available online that are shared with a Creative Commons license, the most often used license to share resources openly. Teachers can, for example, search with filters for OER within well-known repositories like YouTube, Flickr, or Vimeo, but they can also search within OER specific repositories like MERLOT, OASIS, OERCommons or in the Dutch repositories Wikiwijs and edusources. As a result, there is a vast number of OER available for teachers comprising a wide range of types of resources. Generally, OER can be divided in two categories: 'big' and 'little' OERs (Weller, 2010). Big OERs are created by institutes, are often of high quality and are designed with explicit teaching aims. Examples hereof are Open Textbooks, OpenCourseWare, and Open Online Courses. Little OERs are individually created, may not have explicit educational aims, and are made at lower costs, often resulting in low production quality. Little OER can consist of all kinds of smaller resources such as presentations, assignments, assessments, pictures or videos.

Yet, despite the opportunities OER can have to contribute to high quality and accessible education, reuse appears to remain low in higher education. Numerous initiatives to share have been initiated across the globe, but many tamp out after the project funding ends. Sustainable practices with OER are still constrained and it is therefore crucial that we increase our understanding of how we can move from a few single teachers' enthusiasm to a sustainable practice in which resources are continuously shared, reused, and updated. Nevertheless, limited empirical research has been undertaken to investigate how structural adoption of OER in higher education can be enhanced. Hence, this dissertation aimed to examine the challenges of OER adoption in higher education so that we could contribute insights into the sustainability issues many OER initiatives encounter. Four studies were designed to gain insights into (1) teachers' current practices with OER and their need for support to foster OER adoption, (2) teachers' assessments of OERs on quality, (3) the role of brokers in cultivating an inter-institutional community on OER, and (4) teachers' perceived value of that community.

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. 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. Sharing resources, however, happens often, although mainly without an open license as teachers primarily share on a local level within their team or school. In general it could be stated that awareness of the concept of OER is limited.

Teachers' need for support to foster OER adoption was derived from the analysis of the interviews. We discerned several 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 it would be helpful 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 OERs because even if teachers have access to relevant OER, 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.

In Chapter 3, we illustrated how teachers assessed 'big' OERs (i.e. institutionally generated resources designed with explicit teaching aims) on quality. 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.

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. From a teacher perspective they particularly valued ease of access and gaining insights into students' progress. 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 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, individual interviews were scheduled with teachers before and after the plenary meeting, in which they were asked to create association maps on OER to see if they perceptions on OER changed, and to share their experiences, if any, with the use of OERs in their teaching. 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 used 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.

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. This specific inter-institutional community around OER was chosen because (i) this community already had the prerequisites in place since they

explored the feasibility of this collaboration in a prior project, (ii) the institutes had collaboratively designed a new curriculum, and (iii) new topics in this curriculum compelled institutes to develop new resources. However, OER initiatives often struggle to become sustainable once funding ends due to decreasing user engagement. 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 the 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. Teachers could share and find resources in a repository and further connect and share knowledge in an online community. Brokers undertook several actions to endorse the set 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. 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 objective 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.

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. 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: 1557 messages were send. 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, have access to resources and ideas, collaborate on projects, and receive aid during

emergency teaching. Some teachers changed their practice by reusing OERs 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 with and from each other.

In Chapter 6 of the dissertation, we reflected on the main findings of each study and provided recommendations for future research to further enhance our understanding on OER adoption and sustainability of OER initiatives in higher education.

In Chapter 2 and Chapter 3, we examined to what extent teachers currently use OERs, what kind of support they prefer to foster OER adoption, and how they assessed OERs on perceived quality. The findings indicated that teachers' awareness of OER is limited and that they would like to be supported in finding relevant and high-quality OERs and using them in their classes. Moreover, apart from quality concerns, teachers did not adopt OER due to issues with implementing OERs in ongoing courses. We therefore strongly suggest to underpin the usability of OER during curriculum reforms or course transformations. One specific way to increase reuse of OER during such reforms is to let teacher teams collaborative assess relevant OERs. During such meetings, support from librarians and educational technologists must be provided to help teachers answer questions, and overcome issues with regards to the '5R' characteristics. Teachers sometimes discarded resources because, for example, the pedagogical design did not fit the learning approach they were using, the relevance of the content and the provided examples within the OERs did not align with students' future professions, or the readability of a resource did not match with their students' language skills. 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.

In Chapter 4 and Chapter 5 we explored an inter-institutional community on OER. 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. Although our main focus in this dissertation was on the role of brokers, bridgers and brokers could complement each other in spanning boundaries. Bridgers are persons that have a leadership position and concentrate on creating partnerships across institutional, organizational, and community boundaries by connecting people and resources. 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, to be a competent boundary spanner, a set of cognitive, social, and emotional competences need to be mastered. Training trajectories to develop these competencies can support brokers to acquire a sufficient level of competency to be able to fulfil their role effectively. 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.

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. 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. We suggested to frequently evaluate value creation, both on short- and long-term value, throughout the development of the community by analyzing statistics or by talking to teachers, and to actively feeding it back to the community to further promote engagement. Even so, it is vital for communities that there are members who actively contribute, engage, and help others but communities often have a relatively small group of active members. A social perspective in which collaboration is part of teachers' profession could increase engagement in communities. 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).

Next, several practical recommendations for practice derived from this dissertation. First, we advocated, 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. As mentioned before, we especially see value in exploring OER collaboratively in teacher teams during curriculum reforms, in which is it important that 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 assess specific OERs, to align them with their learning objectives, and to adapt them to their specific contexts.

Second, because the findings in this dissertation showed teachers' limited awareness of OER which impacts the acceptance and use of OERs, we recommended to integrate the concept of OER within teaching qualifications, in curricula of teacher education programmes, and faculty development so that a broad awareness of OERs can be realized and teachers are encouraged and enabled to gain some experience with using OER in their teaching.

Third, to ensure that OER communities create and share resources that teachers deem relevant and of good quality, beginning communities should start with exploring teachers' needs for resources. We advised them 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 OERs before publication. Moreover, we suggested that inter-institutional communities on OER should emphasize and highlight the quality procedures that are employed within the community so that teachers will return to search for relevant and quality resources.

Fourth, we wanted to stress the advantages of OER for students' benefits. Inequity is a concern, and students' financial situation is an increasing issue in higher education. Some students simply cannot afford buying course materials, others decide to save money by not buying the recommended materials or to not switch studies due to the costs of buying new materials. Hence, we suggested 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. 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.

Fifth, open pedagogy can contribute to prepare students to master the skills they need for their future role in a knowledge-based society. 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 can become an active member in an open collaborative community. Thus, creating value for society is a core principle of open pedagogy. 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.

Overall, this dissertation contributed to available literature and practices on OER adoption. More specifically, it provided insights into teachers' needs for support and their perspective on OER quality. The findings illustrated 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'.

# SAMENVATTING

In het hoger onderwijs worden curricula met regelmaat aangepast om bij te blijven met de diverse maatschappelijke, technologische en vakinhoudelijke ontwikkelingen. Docenten ontwerpen, actualiseren of herzien voortdurend hun onderwijs om studenten voor te bereiden op de snel veranderende wereld. Hierbij gebruiken zij een breed scala aan leermaterialen om het leerproces van studenten te ondersteunen. Tegenwoordig zijn er veel leermaterialen online beschikbaar die gedeeld zijn met open licenties en daardoor door anderen mogen worden hergebruikt. We noemen deze materialen open leermaterialen (in het Engels bekend als Open Educational Resources). Open leermaterialen zijn leer-, onderwijs- en onderzoeksmaterialen in elk formaat en medium die zich in het publieke domein bevinden of die nog auteursrechtelijk beschermd zijn, maar zijn gepubliceerd onder een open licentie. Deze open licentie stelt gebruikers in staat om de materialen te (her)gebruiken, te bewerken en verder te verspreiden. Het verschil tussen meer traditionele leermaterialen en open leermaterialen worden expliciet gemaakt door de 5R-karakteristieken: gebruikers mogen open leermaterialen (her)gebruiken (*reuse*), opslaan (*retain*), aanpassen (*revise*), remixen (*remix*) en opnieuw delen (*redistribute*). In meer detail betekent dit het volgende:

- Hergebruiken: het leermateriaal kan in onaangepaste vorm gebruikt worden en er zijn geen restricties hoe en waar het materiaal gebruikt wordt. Een docent kan bijvoorbeeld het materiaal in de les gebruiken, in de virtuele leeromgeving, in een video of online.
- Opslaan: het leermateriaal mag opgeslagen worden in persoonlijk archieven of binnen een vakcommunity- of instellingsrepository (databank). Een docent heeft dus de mogelijkheid om kopieën van het materiaal te downloaden, op te slaan, te beheren en te bezitten. Hierdoor is het materiaal altijd lokaal beschikbaar.
- Aanpassen: het leermateriaal mag worden aangepast of herzien om deze af te stemmen op de specifieke behoeften van de gebruiker. Een docent kan bijvoorbeeld het materiaal vertalen, kan content toevoegen om het aan te laten sluiten bij de lokale context of kan er voor kiezen om alleen een deel van het materiaal te gebruiken.
- Remixen: het leermateriaal, hetzij het originele of het aangepaste materiaal, kan worden gecombineerd met andere materialen om iets nieuws te creëren.
- Opnieuw delen: het leermateriaal, oorspronkelijk, aangepast of geremixt, mag worden gedeeld met iedereen. Zo kan een docent bijvoorbeeld kopieën van het materiaal vrij delen met collega's en studenten.

In **Hoofdstuk 1** hebben we het begrip open leermateriaal verder uitgelegd en gepositioneerd binnen de bredere open onderwijs beweging. Deze beweging die internationaal bekend is als *open education*, streeft naar een verschuiving van kennis als koopwaar naar kennis als gemeengoed. Deze beweging is ook breder in

de maatschappij zichtbaar. Zo is hoogstwaarschijnlijk elke wetenschapper bekend met concepten als open access, open data en open science, en is elke programmeur waarschijnlijk bekend met open source software. Concepten zoals open leermaterialen, massive open online courses en open educational practices kunnen allemaal geschaard worden onder open onderwijs. Open onderwijs is niet bedoeld als vervanging voor traditioneel hoger onderwijs, maar streeft er wel naar om iedereen tijdens het leven lang leren vrij toegang te geven tot onderwijs en leermaterialen.

Voor studenten heeft open leermateriaal als belangrijkste voordeel dat ze gratis toegang hebben tot deze materialen. Dit is cruciaal om de toegang tot hoger onderwijs te vergroten. Een ander voordeel is dat open leermaterialen de verscheidenheid aan leermaterialen die studenten gebruiken om hun leerproces te ondersteunen kan verbreden. Verschillende type materialen, verschillende pedagogieën of gewoon het zien van andere voorbeelden zijn redenen waarom studenten vaak op zoek zijn naar aanvullende leermaterialen. Voor docenten daarentegen heeft het kunnen hergebruiken van open leermaterialen als belangrijk voordeel dat ze zo niet zelf alle materialen hoeven te ontwikkelen bij het ontwerpen of herzien van curricula. Docenten kunnen en mogen de open leermaterialen aanpassen op hun specifieke context. Een docent kan zo besluiten om alleen delen van een leermateriaal te gebruiken (bijvoorbeeld één hoofdstuk van een tekstboek), om leermateriaal te herzien om zo beter de lokale of specifieke context te illustreren (bijvoorbeeld door lokale voorbeelden toe te voegen of diversiteit te includeren) of door leermateriaal te remixen met andere materialen om de cursusinhoud voor studenten te verbeteren (bijvoorbeeld om differentiatie te bieden).

Tegenwoordig zijn er meer dan twee miljard bronnen online beschikbaar die open worden gedeeld met een Creative Commons-licentie. Dit is de meest gebruikte licentie om bronnen open te delen. Docenten kunnen bijvoorbeeld zoeken met filters voor open leermaterialen binnen bekende repositories zoals YouTube, Flickr of Vimeo, maar ze kunnen ook zoeken binnen specifieke repositories voor open leermaterialen zoals MERLOT, OASIS, OERCommons of in de Nederlandse repositories Wikiwijs en edusources. Docenten kunnen online zoeken naar een breed scala aan open leermaterialen en in het algemeen kunnen deze worden verdeeld in twee categorieën: 'grote' en 'kleine' leermaterialen. Zogeheten ‘grote’ open leermaterialen worden gemaakt door instellingen, zijn vaak van hoge kwaliteit en zijn ontworpen met expliciete onderwijsdoelen. Voorbeelden hiervan zijn Open Textbooks, OpenCourseWare en Open Online Cursussen. Kleine open leermaterialen worden individueel gemaakt, kennen vaak geen expliciete educatieve doelen en worden gemaakt tegen lagere kosten, wat resulteert in een lagere productiekwaliteit. Kleine open leermaterialen kunnen bestaan uit allerlei soorten kleinere typen materialen zoals presentaties, opdrachten, afbeeldingen of video's.

Toch blijft hergebruik van open leermaterialen in het hoger onderwijs beperkt, ondanks de mogelijkheden die het biedt voor hoogwaardig en toegankelijk onderwijs. De afgelopen jaren zijn er wereldwijd diverse initiatieven om materialen

te delen gestart, maar veel van deze verdwijnen ook weer nadat de projectfinanciering is afgelopen. Duurzame praktijken met open leermaterialen zijn nog steeds beperkt. Het is daarom cruciaal dat we ons begrip vergroten hoe we van het enthousiasme van enkele individuele docenten naar een duurzame praktijk kunnen komen waarin leermaterialen continu worden gedeeld, hergebruikt en bijgewerkt. Er is echter nog maar beperkt empirisch onderzoek gedaan naar hoe de structurele adoptie van open leermaterialen in het hoger onderwijs kan worden verbeterd. Deze dissertatie had dan ook tot doel om de uitdagingen van adoptie van open leermaterialen in het hoger onderwijs te onderzoeken, zodat we kunnen bijdragen aan inzichten rondom duurzaamheidskwesties waarmee veel open leermaterialen initiatieven worden geconfronteerd. We hebben vier studies ontworpen om meer inzicht in te krijgen in (1) de huidige praktijken van docenten met open leermaterialen en hun behoefte aan ondersteuning om adoptie te bevorderen, (2) de beoordelingen van docenten van open leermaterialen op kwaliteit, (3) de rol van brokers (in het Nederlands soms kennismakelaars genoemd) bij het ontwikkelen van een vakcommunity rondom open leermaterialen en (4) de door docenten waargenomen waarde van deze vakcommunity.

In het verkennende onderzoek dat is beschreven in Hoofdstuk 2, hebben we een beeld gevormd van de huidige mate van adoptie van open leermaterialen. We hebben in deze studie gekozen voor een *mixed-methods* methode waarbij we zowel data hebben verzameld via een vragenlijst als via semigestructureerde interviews. Totaal hebben we 143 vragenlijsten ontvangen die ons inzicht hebben gegeven in de huidige mate van adoptie van open leermaterialen. Daarnaast hebben we interviews afgenomen met 11 docenten om de huidige praktijken van docenten in meer detail te verkennen en om inzicht te krijgen in hun behoefte aan ondersteuning bij het hergebruiken van open leermaterialen. De adoptiepiramide (Cox & Trotter, 2017) is gebruikt als theoretisch raamwerk, omdat in dit raamwerk de onderlinge afhankelijkheid van factoren benadrukt worden die de adoptie van open leermaterialen kunnen belemmeren.

De analyse van de gegevens uit de vragenlijst en de interviews lieten zien dat de adoptie van open leermaterialen nog beperkt is. Het is echter belangrijk te benadrukken dat deze bevinding beïnvloed kan worden door wat bekend staat als *dark reuse* (Wiley, 2009). Docenten kunnen materialen uit bestaand cursusmateriaal, repositories of van collega's gebruiken zonder zich te realiseren dat dit open leermaterialen zijn. Het delen van materialen daarentegen vindt wel op grotere schaal plaats, zij het dat deze hoofdzakelijk gedeeld worden zonder een open licentie omdat het materiaal gedeeld wordt binnen het eigen team of binnen de instelling. Over het algemeen geldt dat de bekendheid met het concept open leermaterialen nog gering is.

De interviews hebben ons inzicht gegeven in de ondersteuning die docenten zich wensen in relatie tot open leermaterialen, welke we hebben gegroepeerd in drie overkoepelende thema's: beschikbaarheid, ondersteuning en visie en beleid. Het eerste thema, beschikbaarheid van open leermaterialen, had

betrekking op de behoefte van docenten om ondersteuning te hebben bij het zoeken en vinden van open leermaterialen. Bijna alle docenten gaven aan dat ze geholpen zouden zijn als ze een overzicht zouden krijgen van beschikbare open leermaterialen binnen hun vakgebied. De beschikbaarheid van relevante open leermaterialen kan daarnaast ook worden versterkt door samenwerking op te zoeken in vakcommunity's, zowel binnen de instelling als met andere hogescholen. Het tweede thema richt zich op de vaardigheden van docenten om open leermaterialen te (her)gebruiken of te delen. Toegang tot open leermaterialen alleen is niet voldoende om hergebruik te bevorderen, want verschillende docenten benadrukten dat pedagogische en technologische ondersteuning beschikbaar moet zijn. Bijvoorbeeld in de vorm van *on-the-job* ondersteuning van onderwijskundig experts of door formele scholingsmomenten te organiseren. Het derde thema, visie en beleid, relateert aan het feit dat docenten aangaven onzeker te zijn over wat is toegestaan met betrekking tot het delen en hergebruiken van materialen binnen de instelling. Het communiceren van richtlijnen binnen een visie of beleid over open leermaterialen kan hergebruik bevorderen.

In Hoofdstuk 3 hebben we vervolgens gekeken hoe docenten, als ze een overzicht ontvangen van relevante 'grote' open leermaterialen (materialen met expliciete onderwijsdoelen, ontworpen door een instelling) binnen hun vakgebied op waarde schatten. Binnen dit kwalitatieve onderzoek namen 11 docenten deel, allen werkzaam bij dezelfde hogeschool. De docenten werden verdeeld in drie groepen op basis van het vak dat ze gaven: business analytics, interculturele communicatie en onderzoeksmethoden. Deze vakken waren gekozen omdat ze op meerdere faculteiten binnen de instelling werden gegeven. Elke groep bestond uit drie of vier docenten en zij kwamen eenmaal bijeen om de verschillende open leermaterialen te bespreken die wij hadden verstrekt. Voor en na deze bijeenkomst werden nog individuele interviews afgenomen.

We hebben vijf thema's geïdentificeerd die de diverse elementen beschrijven die docenten meenamen in hun beoordelingen van het materiaal. Het eerste thema had betrekking op de inhoud van de materialen, waarbij docenten keken naar relevantie, focus, juistheid, structuur en de verbinding met het toekomstige werkveld van studenten. Het tweede thema had betrekking op het ontwerp van het materiaal. Docenten beoordeelden het pedagogische ontwerp en keken daarbij expliciet of het overeen kwam met hun eigen onderwijsaanpak en filosofie. Ze benadrukten ook dat de leermaterialen aantrekkelijk moeten zijn en een mix van leeractiviteiten moeten bieden om studenten te motiveren. Docenten keken daarnaast ook naar de granulariteit, de uitgever en de productiedatum van de materialen. Het derde thema, bruikbaarheid, heeft vooral betrekking op de beoordeling van de lay-out, het navigatiegemak en de gebruikersvriendelijkheid van het materiaal, gezien vanuit het perspectief van studenten. Vanuit een docentperspectief werd vooral gekeken naar hoe eenvoudig het materiaal te benaderen was en of de voortgang van studenten inzichtelijk was. Het vierde thema, interactie, richtte zich op de mogelijkheden voor studenten om met de

materialen te interacteren. Docenten waardeerden de oefeningen, al dan niet met geautomatiseerde feedback, de beschikbaarheid van video's en andere interactieve functies in de leermaterialen. Het vijfde thema betrof de leesbaarheid van de materialen. De leermaterialen zouden beknopte, *to-the-point* tekst moeten hebben die niet te academisch is, vooral voor materialen die niet in de Nederlandse taal zijn geschreven.

Daarnaast hebben we onderzocht of de perceptie van docenten over open leermaterialen veranderde. Dit hebben we gedaan door hun associaties met open leermaterialen, die ze voor en na de bijeenkomst op een A3-papier schreven, te analyseren. Hieruit kwamen drie hoofdthema's naar voren: (i) de bekendheid met het concept veranderde van een beperkt begrip naar een toegenomen begrip van de onderscheidende kenmerken van open leermaterialen; (ii) de houding van docenten veranderde van twijfelachtige beelden over de kwaliteit van open leermaterialen naar een positief beeld dat het van meerwaarde kan zijn voor hun lessen; en (iii) docenten gaven aan beter te weten hoe open leermaterialen hergebruikt kunnen worden, maar dat praktische kwesties wel een punt van aandacht bleef. Over het algemeen waren de docenten onder de indruk van de kwaliteit van de materialen. Toch gaven slechts drie docenten aan materialen te hebben hergebruikt in hun onderwijs en dan voornamelijk als aanvullend materiaal. Het bleek dat het implementeren van open leermaterialen in bestaande cursussen lastig is vanwege de inspanning en tijd die nodig is om de materialen te integreren in een al bestaand cursusontwerp.

De laatste twee studies werden uitgevoerd binnen de context van een vakcommunity genaamd ‘Samen hbo verpleegkunde’. Deze vakcommunity bestond uit 15 hogescholen in Nederland die allen een bacheloropleiding Verpleegkunde aanbieden. We kozen specifiek voor deze vakcommunity vanwege de volgende redenen: (i) de haalbaarheid van deze samenwerking was al in een eerder project onderzocht, (ii) de instellingen hadden gezamenlijk een nieuw curriculum ontwikkeld en (iii) nieuwe onderwerpen in dit curriculum zorgden ervoor dat materialen ontwikkeld moesten gaan worden. Toch is bekend dat initiatieven rondom open leermaterialen niet altijd levensbestendig blijken te zijn zodra de financiering eindigt, voornamelijk vanwege afnemende betrokkenheid van gebruikers. Zogenaamde brokers (kennismakelaars) kunnen hierbij een belangrijke rol spelen. Zo kunnen zij verbindingen versterken tussen de verschillende instellingen en de overdracht van kennis en materialen stimuleren over organisatorische grenzen heen (Akkerman & Bakker, 2011). Het is hierbij belangrijk op te merken dat brokers worden gedefinieerd door hun rol en niet hun organisatorische positie.

In Hoofdstuk 4 hebben we in een kwalitatieve beschrijvende studie de complexiteit van de rol van deze brokers onderzocht door middel van *cultural-historical activity theory* (Engeström, 1987). We hebben diverse data verzameld, waaronder projectdocumenten, procesrapporten, reflectierapporten en door een

online focusgroep te organiseren. Het doel van de vakcommunity was om een duurzame samenwerking tussen instellingen te creëren waarbij het delen van (onderwijs)praktijken, kennis en open leermaterialen gemeengoed is. In de vakcommunity konden docenten materialen uitwisselen in een repository en nader contact zoeken en kennis uitwisselen in een online community. Brokers hebben verschillende acties ondernomen om de vakcommunity te cultiveren. Zo hebben ze (i) docenten gestimuleerd om actief te worden in de vakcommunity, (ii) het gebruik van de repository met leermaterialen bevorderd, (iii) het gebruik van de online community bevorderd en (iv) de noodzakelijke organisatorische structuren binnen de instellingen gecreëerd. Brokers concludeerden dat een kleinschalige, persoonlijke en inhoudsgerichte aanpak het meest waardevol was, hoewel er een breed scala aan instrumenten nodig was om de geformuleerde doelstellingen te bereiken. De acties van de brokers hadden impact: steeds meer docenten maakten gebruik van de repository en de online community en er was een wijdverspreid enthousiasme om over instellingen heen samen te werken. Bovendien merkten de brokers op dat de grenzen tussen instellingen leken te vervagen en nieuwe samenwerkingsprojecten werden door docenten geïnitieerd. Daarnaast leverde de vakcommunity ook onverwachte resultaten op. Zo gaven sommige brokers aan dat docenten een groter bewustzijn hadden kregen van het curriculum en anderen constateerden dat het gemeenschappelijk opgestelde kwaliteitsmodel leidde tot goede discussies over kwaliteit binnen de curriculumcommissies van de instelling.

Toch waren er ook moeilijkheden waar de brokers in hun rol tegenaan liepen, de zogeheten rolconflicten. Ondanks dat de vakcommunity werd gebruikt door docenten, hadden ze nog niet het gevoel dat hun acties leidde tot grootschalige verandering in de manier waarop docenten werkten binnen de instelling. Bovendien hadden de brokers soms moeite met de onduidelijkheid en de vele verantwoordelijkheden van hun rol. Dit werkt versterkt doordat ze niet altijd de steun van hun team of van het management kregen om de geformuleerde doelstellingen te realiseren. Daarnaast werden ze ook beïnvloed door verschillende organisatorische beperkingen. Reorganisatie, personeelsveranderingen en de impact van Covid-19 waren allen factoren die de aandacht afleidde van het overbruggen van grenzen tussen instellingen.

Op lange termijn kunnen vakcommunity's alleen blijven bestaan als docenten het gevoel hebben dat participatie waardevol is. Voor het verduurzamen van vakcommunity's is het belangrijk dat docenten actief blijven zodat kennis en middelen voortdurend worden gedeeld en up-to-date blijven. In Hoofdstuk 5 hebben we de waardecreatie binnen de vakcommunity inzichtelijk gemaakt. We hebben een *mixed-method design* gebruikt waarbij we gebruikersdata hebben verzameld, een vragenlijst hebben afgenomen en semi-gestructureerde interviews hebben gevoerd met vier docenten. Het Value Creation Framework (Wenger et al., 2011) is gebruikt om onze gegevens te analyseren, wat ons in staat stelde 'de toegevoegde waarde *voor* communityleden zoals gedefinieerd *door* communityleden' te verduidelijken (Dingyloudi et al., 2019, p. 217). Dit hebben we

gedaan op zowel individueel (de interviews) als op collectief niveau (gebruikersstatistieken en vragenlijst) op basis van de vijf waardecreatie cycli (Wenger et al., 2011): directe waarde, potentiële waarde, toegepaste waarde, gerealiseerde waarde en hervormingswaarde.

De bevindingen van ons onderzoek toonden aan dat waardecreatie op alle vijf de waardecycli heeft plaatsgevonden. De kwantitatieve gegevens benadrukten voornamelijk de directe waarde. Tussen het begin van het project in 2018 en medio juli 2021 (zes maanden na het officiële einde van het project) werden in totaal 1458 leermaterialen gedeeld in de repository, inclusief materialen van derden. Het totale aantal leden van de online community steeg gestaag tot 891 gebruikers in juli 2021. Leden van de online community hebben in totaal 586 berichten geplaatst en hebben 789 opmerkingen en 907 likes ontvangen. Het grootste aantal activiteiten had betrekking op de chatberichten, totaal zijn er 1557 verstuurd. Deze gegevens toonden aan dat de deelname doorging na het officiële einde van het project. Over het algemeen werd uit de combinatie van kwantitatieve en kwalitatieve gegevens duidelijk dat er belangrijke waardecreatie plaatsvond vanuit de persoonlijke behoeften van de docenten, wat resulteerde in dominante directe en potentiële waarden. De vakcommunity bood de docenten verschillende voordelen, waaronder de mogelijkheid om te netwerken met collega's, toegang te krijgen tot nieuwe middelen en ideeën, samen te werken aan projecten en hulp of advies te ontvangen bij vragen of issues. Toegepaste waarde was zichtbaar doordat sommige docenten open leermaterialen hadden gebruikt in het onderwijs of doordat ze nieuwe samenwerkingspraktijken hadden opgezet met collega's van andere instellingen. De gerealiseerde en de hervormingswaarde werden kwamen minder naar voren in onze data. Het kan zijn dat het nog te vroeg was om deze waarden te onderscheiden of dat dit van docenten een reflectie vraagt op abstracte begrippen van succes.

We raden vakcommunity's aan het Value Creation Framework (Wenger et al., 2011) te gebruiken om vooruit te kijken en te onderzoeken hoe aanvullende waardecreatie kan worden gestimuleerd. Bovendien is het belangrijk dat de activiteiten die door docenten als waardevol worden beschouwd binnen de vakcommunity te koppelen aan de urgente problemen van de instelling, zodat op die manier ook de benodigde ondersteuning van het management wordt gerealiseerd.

In Hoofdstuk 6 van het proefschrift worden de resultaten van de voorgaande hoofdstukken samengevat. Daarnaast reflecteren we op de belangrijkste bevindingen van het onderzoek en de bijdrage die we daarmee leveren aan adoptie van open leermaterialen in het hoger onderwijs.

Zo hebben we in Hoofdstuk 2 en Hoofdstuk 3 inzichtelijk gemaakt hoe op dit moment docenten open leermaterialen gebruiken, welke ondersteuning ze wensen en hoe ze open leermaterialen op waarde schatten. Hierbij bleek dat de bekendheid onder docenten met het concept open leermaterialen nog beperkt is en dat ondersteuning gewenst is bij zowel het vinden van relevante materialen als

het gebruik hiervan in het eigen onderwijs. Docenten benadrukten de uitdaging om relevante en kwalitatieve open leermaterialen te integreren in bestaande vakken. Een specifieke manier om het hergebruik van open leermaterialen tijdens het ontwerpen van onderwijs te stimuleren is docentontwikkelteams gezamenlijk relevante leermaterialen te laten beoordelen. Het is hierbij van belang dat ondersteuning aanwezig is vanuit de bibliotheek en ICT-onderwijskundigen, zodat zij direct ondersteuning kunnen bieden rond de praktische aspecten van hergebruik. Daarnaast bleek dat materialen soms positief werden ontvangen, maar niet bruikbaar bleken te zijn omdat de voorbeelden in het materiaal niet aansloten bij het toekomstige werkveld van studenten of omdat de leesbaarheid onvoldoende was. Meer aandacht kan worden gegeven aan het feit dat open leermaterialen aangepast en herzien mogen worden om deze problemen op te lossen. Zo kan bijvoorbeeld Artificial Intelligence helpen om Engelse teksten te versimpelen of te vertalen naar het Nederlands.

In Hoofdstuk 4 en Hoofdstuk 5 hebben we een vakcommunity verkend waarin docenten van diverse hogescholen kennis en materialen uitwisselen. *Cultural-historical activty theory* (Engeström, 1987) bood ons een waardevol conceptueel kader om de complexe context waarin de brokers waren gepositioneerd te analyseren. De bevindingen toonden aan dat de brokers diverse acties hebben ondernomen, maar daarbij ook rolconflicten ervaarden. Deze conflicten ontstonden door de veeleisende context waarin ze werkten, de ambiguïteit van hun rol en de organisatorische beperkingen waarmee ze werden geconfronteerd. Het kan helpen om brokers (kennismakelaars) in verbinding te zetten met bridgers (in het Nederlands bruggenbouwers genoemd). Bridgers zijn personen met een leiderschapspositie die zich richten op het creëren van partnerschappen over grenzen heen door mensen en middelen met elkaar te verbinden. Door deze rollen samen te brengen kunnen potentiële conflicten direct op het juiste plek worden opgepakt. Daarnaast kunnen trainingstrajecten om cognitieve, sociale en emotionele competenties te ontwikkelen brokers helpen bij het vervullen van hun rol. De acties van de brokers zullen echter zinloos zijn als docenten geen waarde ervaren van de vakcommunity. Om waarde inzichtelijk te maken adviseren we vakcommunity's om waardecreatie regelmatig te evalueren en terug te koppelen aan de gebruikers. Daarbij kan het helpen om niet alleen de individuele waarde (zoals toegang tot materialen, hulp bij vraagstukken, verbinding met collega's) maar ook de publieke waarden (zoals rechtvaardigheid, inclusiviteit, toegankelijkheid) te benadrukken.

Vervolgens zijn verschillende praktische aanbevelingen voor de praktijk afgeleid van dit proefschrift. Ten eerste hebben we, net als vele anderen, gepleit voor ondersteuning van docenten bij het zoeken, aanpassen en delen van open leermaterialen. Eerder hebben we al genoemd dat curriculumherziening een passend moment is om de mogelijkheden van open leermaterialen te verkennen. Het is hierbij van belang dat docentontwikkelteams voldoende tijd beschikbaar krijgen om gezamenlijk relevante open leermaterialen te verkennen, aan te passen

aan hun specifieke contexten en te integreren in het onderwijs. Ten tweede raden we aan het concept van open leermaterialen te integreren in de basiskwalificaties (BDB en BKO), in het curriculum van lerarenopleidingen en in het aanbod van professionele ontwikkeling binnen een instelling. Op deze manier kan niet alleen een breder bewustzijn van open leermaterialen worden gerealiseerd, maar worden docenten ook in staat gesteld ervaring op te doen met open leermaterialen in hun onderwijs. Ten derde is het van belang dat vakcommunity's materialen delen die van goede kwaliteit zijn. We adviseren beginnende vakcommunity's om (i) inzicht te krijgen in de voorkeuren van zowel docenten en studenten voor leermaterialen, (ii) een vakvocabulaire te creëren, zodat materialen kunnen worden gekoppeld aan een gemeenschappelijke standaard en (iii) een kwaliteitsmodel te creëren dat kan worden gebruikt voor het peer-reviewen van open leermaterialen. Vakcommunity's die al voorbij de opstartfase zijn kunnen de kwaliteitsborging inzichtelijk maken, zodat docenten terugkeren om relevante en kwalitatief hoogwaardige bronnen te zoeken. Ten vierde willen we de voordelen van open leermaterialen voor studenten benadrukken. Niet iedere student heeft de middelen om verplichte studiematerialen zelf aan te schaffen. Om de toegankelijkheid van het hoger onderwijs te vergroten, stellen we voor om het gebruik van open leermaterialen in het eerste jaar van het hoger onderwijs te verkennen. Juist in het eerste jaar vallen veel studenten uit of wisselen tussentijds van studie. Samenwerking aan het ontwikkelen van nieuw materiaal of het aanpassen van bestaand open materiaal op landelijk niveau is mogelijk doordat de meeste vakken in het eerste jaar vergelijkbare inhoud hebben. Ten vijfde adviseren we instellingen om de focus niet alleen te hebben op het produceren en hergebruik van open leermaterialen, maar ook aandacht te hebben voor de pedagogische mogelijkheden van open materialen en het open gedachtegoed (open pedagogy). De kern van open pedagogy is het toevoegen van waarde, studenten consumeren niet alleen kennis maar dragen ook actief bij aan kenniscreatie. Denk bijvoorbeeld aan het open delen van producten van studenten met het werkveld, studenten bestaande open materialen door te laten ontwikkelen, of studenten te laten participeren in een open netwerk.

Tot slot, al met al heeft dit proefschrift bijgedragen aan de beschikbare literatuur en praktijken met betrekking tot adoptie van open leermaterialen. De bevindingen illustreerden het potentieel van open leermaterialen voor het hoger onderwijs, maar het perspectief van docenten op de kwaliteit van open leermaterialen blijft een voortdurende zorg. Vakcommunity's rond open leermaterialen kunnen deze zorgen verminderen, omdat middelen worden gedeeld met collega's binnen een specifiek domein. Brokers zijn essentieel om de vakcommunity te cultiveren, maar ze moeten wel voldoende worden ondersteund in hun rol. Duurzaam kan een vakcommunity alleen worden als docenten het gevoel hebben dat het hen waarde biedt. Een focus op waardecreatie (zowel individuele als publieke waarden) in combinatie met kwaliteitsborging voor open leermaterialen kan een manier zijn om duurzame adoptie van open leermaterialen te bevorderen.

# CURRICULUM VITAE

Marjon Baas was born in Hoorn on July 26, 1989. After graduating from Martinuscollege in Grootebroek in 2007, she started studying Educational Design, Management and Media at the University of Twente. She obtained her Bachelor's degree in 2010, after which she continued her studies at the same university with the master Educational Science & Technology. She specialized in Human Resource Development and studied abroad for an extra-curricular semester at the University of Oslo, Norway. Early 2012, Marjon completed her Master's degree at the University of Twente, after which she started her professional career as a junior adviser at an accreditation of prior learning firm. Late 2012, Marjon became an educational technologist at the ICT & Education department of Saxion University of Applied Sciences. In 2015, she joined the Dutch national SURF Special Interest Group Open Education as a board member. Subsequently, her interest in open education increased which led to her decision to pursue a doctorate degree by submitting a proposal for a PhD grant at Saxion in 2017. This grant was awarded and Marjon started her research on teachers' adoption of open educational resources in higher education at Leiden University, Graduate School of Teaching (ICLON). Currently, Marjon continues her work at Saxion at the Teaching and Learning Centre as an educational consultant with a specific focus on projects that relate to open education, digital assessment, and continuous professional development.

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Leiden University Graduate School of Teaching

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