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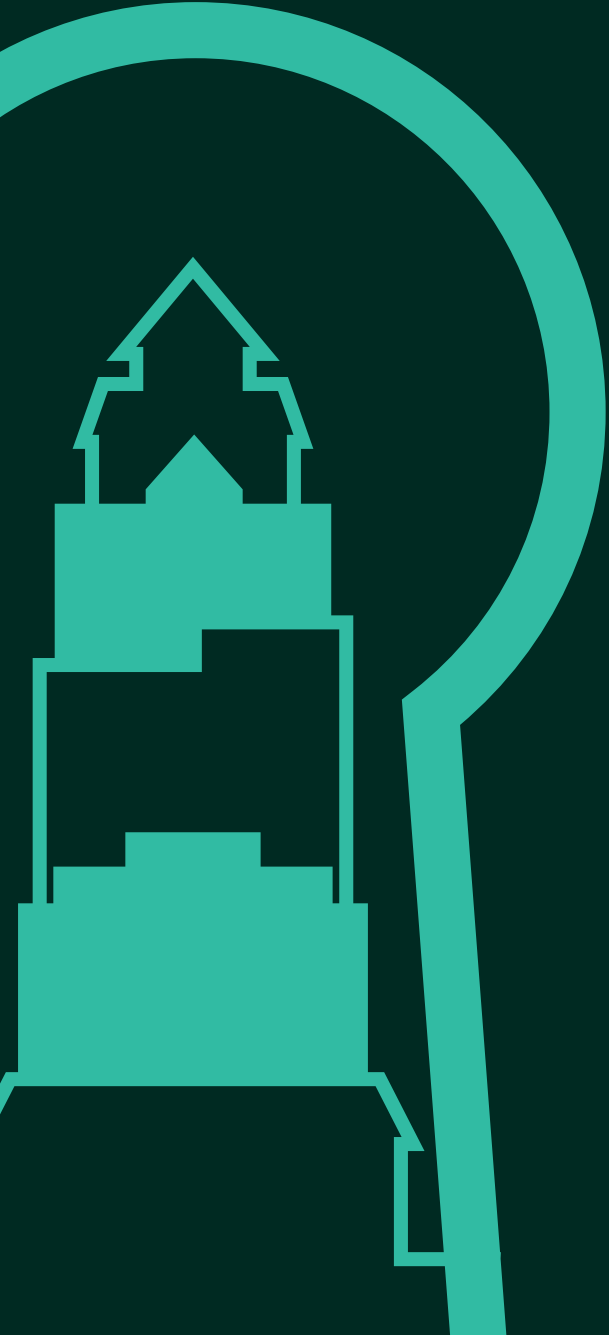
Introduction

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

1	GENERAL INTRODUCTION: OER IN DUTCH HIGHER EDUCATION

WITHIN A UNIVERSITY OF APPLIED SCIENCES   WITHIN AN INTER-INSTITUTIONAL COMMUNITY

2	NEED FOR SUPPORT Mixed-methods: questionnaire and interviews	**4**	THE ROLE OF BROKERS Qualitative: focus group, process reports, reflection reports, documents
3	ASSESSMENTS OF OER Qualitative: interviews, association maps, plenary meetings	**5**	VALUE CREATION Mixed-methods: questionnaire, interviews, user statistics

6	GENERAL DISCUSSION: PURSUING SUSTAINABLE OER INITIATIVES