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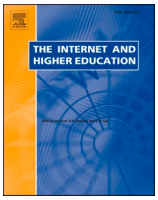

# Would you use them? A qualitative study on teachers' assessments of open educational resources in higher education

Marjon Baas [a,b,*], Roeland van der Rijst [a], Tjark Huizinga [b], Ellen van den Berg [b], Wilfried Admiraal [c]

[a] ICLON-Graduate School of Teaching, Leiden University, Kolffpad 1, 2333 BN, Leiden, The Netherlands
[b] School of Education, Saxion University of Applied Sciences, Van Galenstraat 20, 7511 JL, Enschede, The Netherlands
[c] Centre for the Study of Professions, Oslo Metropolitan University, Pilestredet 40, N-0170, Oslo, Norway

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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.

## 1. 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 (e.g., Baas & Schuwer, 2020; Bozkurt, Koseoglu, & Singh, 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, Admiraal, & Van den Berg, 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 iRubric (Morehouse et al., 2021). 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 & McBride, 2018; Clements & Pawlowski, 2012; Kimmons, 2015), reviewers' (Fischer, Ernst, & Mason, 2017), and students' perceptions

* Corresponding author at: ICLON-Graduate School of Teaching, Leiden University, Kolffpad 1, 2333 BN, Leiden, The Netherlands.
*E-mail addresses:* m.a.a.baas@iclon.leidenuniv.nl (M. Baas), rrijst@iclon.leidenuniv.nl (R. van der Rijst), t.huizinga@saxion.nl (T. Huizinga), wilfried@oslomet.no (W. Admiraal).

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(Cutler, 2019; Howard & Whitemore, 2020; Morales & Baker, 2018; Nipa & Kermanshachi, 2020; Oelfke et al., 2021). Other studies examined teachers' perceptions of the quality of traditional resources (Ayala Doval & Gómez-Zermeño, 2017; Karolčík, Čipková, Veselský, Hrubišková, & Matulčíková, 2017), but again only quantitative measures were used. Existing qualitative research on teachers' assessments of OER (Belikov & McLure, 2020; Watson, Domizi, & Clouser, 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 III, Larsen, Wiley, & Fischer, 2019; Sansom, Clinton-Lisell, & Fischer, 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.

## 2. Assessment of OER quality

### 2.1. 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 Fig. 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.

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, Munnik, & Will, 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 et al. (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.

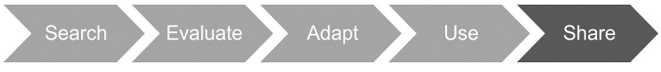


**Fig. 1.** *Re*-use process for teachers re-using OER (Clements & Pawlowski, 2012).

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 redesigners) 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, King, and Miller (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 & Whitemore, 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 (Cutler, 2019; Howard & Whitemore, 2020; Morales & Baker, 2018; Nipa & Kermanshachi, 2020; 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 III 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.

### 2.2. 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, Burrus, & Baraniuk, 2008), automated analysis (Başaran, 2016; Cechinel, Sánchez-Alonso, & García-Barriocanal, 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, Havemann, & Priego, 2014; Clements, Pawlowski, & Manouselis, 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, Robinson, Hilton, & Wiley, 2013), while the *Framework for selecting OER on the basis of fitness for purpose* (Jung, Sasaki, & Latchem, 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).

## 3. 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, VH, and SURF, 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, Admiraal, & Van den Berg, 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.

## 4. Method

### 4.1. 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.

### 4.2. 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,

**Table 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 |

and their experience in teaching in higher education varied from 1 year up to 14 years. In Table 1 the pseudonyms and demographics of the participating teachers are presented.

### 4.3. 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 Fig. 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.

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, Cochran, Fagerheim, & Thoms, 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 A.

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.

### 4.4. 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 Fig. 2).

#### 4.4.1. 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.

#### 4.4.2. 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.

#### 4.4.3. 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.

### 4.5. Data analyses

#### 4.5.1. 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

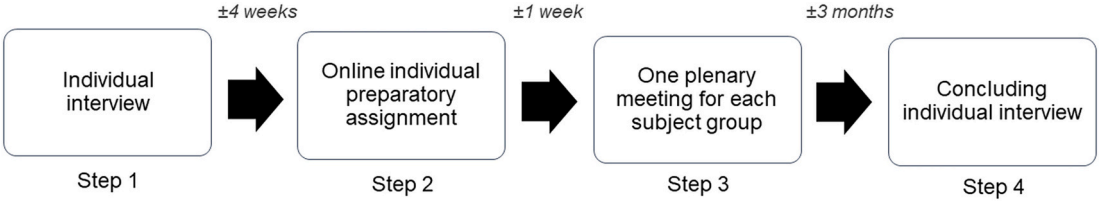


**Fig. 2.** Research procedure.

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.

#### 4.5.2. 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 2 contains the final themes and scores for teachers' remarks on each OER.

#### 4.5.3. 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, Admiraal, Brekelmans, & Oost, 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.

## 5. Findings

### 5.1. 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.

#### 5.1.1. 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.

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 necessarily agree with this, while Amy emphasizes the impossibility to design an OER that aligns with all contexts.

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.'*

#### 5.1.2. 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 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.

#### 5.1.3. 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

**Table 2**
Overview of teachers' comments on the elements within the five themes.

| | | Business analytics (BA) | | | | | | | | | | | | Intercultural communication (IC) | | | | | | | | | | Research methods (RM) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ray | | | | Joe | | | | Kyle | | | | Andy | | | Chelsea | | | Jake | | | Stephanie | | | Terry | | | | Amy | | | | Rosa | | | | Melissa | | | |
| Theme | Elements OER | 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 |
| Content | Relevance | − | | − | | + | + | − | | + | + | + | | | | o | − | | | + | + | + | + | + | − | o | − | | o | + | + | + | | − | o | | | + | + | | + |
| | Scope | − | | − | − | + | | | − | o | − | | − | + | | | | | | + | | | + | + | − | | − | | + | | o | | o | | | | o | o | + | | + |
| | Future profession | − | − | | | | + | | − | − | + | | | | | | | | | | | o | | − | | | − | | | | o | | | − | o | | | | + | | |
| | Correctness | | | | − | + | | | | o | | + | | | 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 | + | + | | | | + | | | | + | − | | | − | | | − | | | | | | | | | | | | | | | | | | | o | | | |
| | Access | | | | | | | | | | + | | | + | | | | | | | | − | | | | | | − | | + | | | − | + | | | + | | + | − | |
| | Insight in students' progress | | − | | | | − | | | | | | | | | o | | | | o | | o | | | | | | | | | | | | | | | | | | | |
| Engagement | Exercises | + | | − | | | + | | | − | + | | − | | | | | | | | | | − | | | | | | | + | | | | o | | | | + | o | | | + |
| | Videos | | | | + | | | | − | | | | + | + | | o | | | − | o | o | o | | − | | | | | | | | | | | | | | + | o | | | + |
| | Feedback | | | | | | + | | | | + | | | | | | | | | | | | | | | | | | | | | | | o | | | | o | | | + |
| | Interactivity | + | + | | | | + | | | − | + | − | | | | | | | | | | | | | | | | | | | | | | | | | | + | | | |
| | Progress bar | | | | | | + | | | + | + | | | | | + | | | + | | | | | | | | | | | − | | | | | | | | | | | |
| Readability | 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 A for an overview of all OERs discussed in this study.

**Table 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.* |

**Table 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.* |

insights into students' progress and results in order to attune their teaching to students' needs. In Table 5 an excerpt is given in which teachers of the IC group express their concerns regarding this issue.

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.

**Table 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.* |

#### 5.1.4. 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. 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. In Table 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.

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.

#### 5.1.5. 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 7 an excerpt of a discussion is provided in which some teachers' reasoning on readability is illustrated.

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.

### 5.2. 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

**Table 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.* |

**Table 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?'* |

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.

### 5.2.1. 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.

*5.2.1.1. Theme 1: Awareness.* The theme of 'awareness' illustrates the changes in teachers' understanding of OER. 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). Chelsea's pre and post maps (IC, Figs. 3 and 4) illustrate an increased awareness regarding '5R' characteristics and license mechanisms.

*5.2.1.2. 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, Figs. 5 and 6) illustrate this.

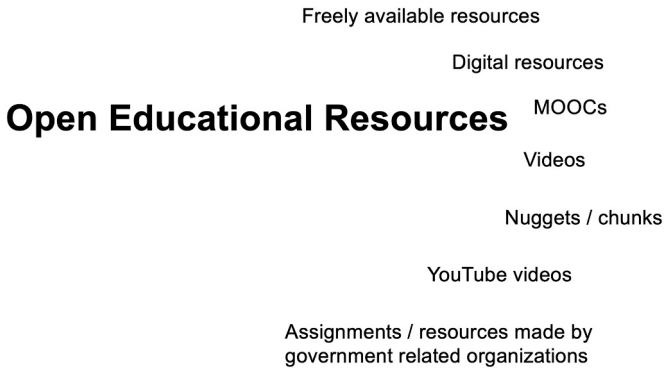


**Fig. 3.** Pre map: Chelsea (IC).

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'.

*5.2.1.3. 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, Figs. 7 and 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.

### 5.2.2. 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

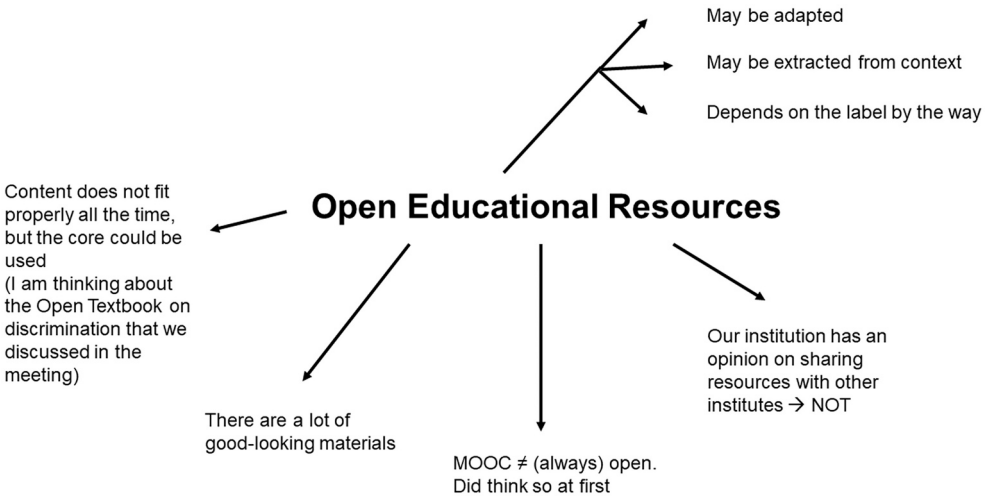


**Fig. 4.** Post map: Chelsea (IC).

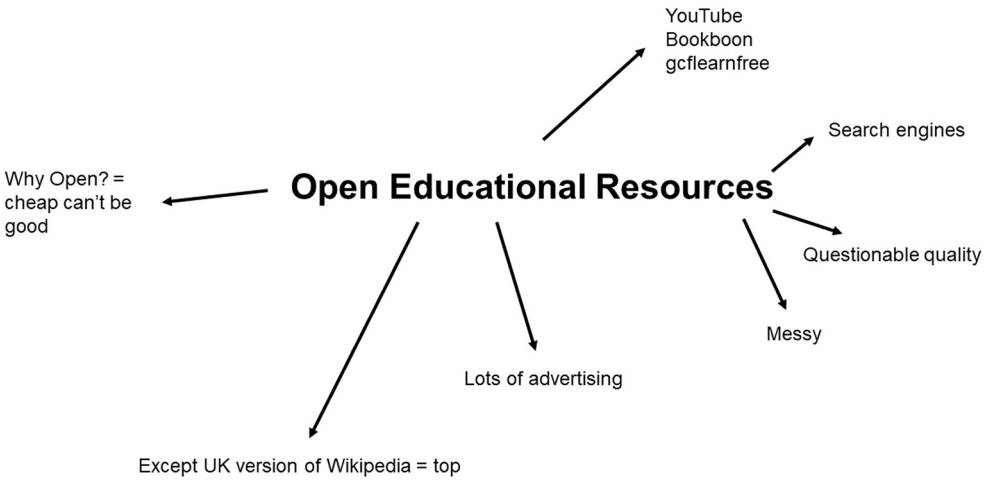


**Fig. 5.** Pre map: Joe (BA).

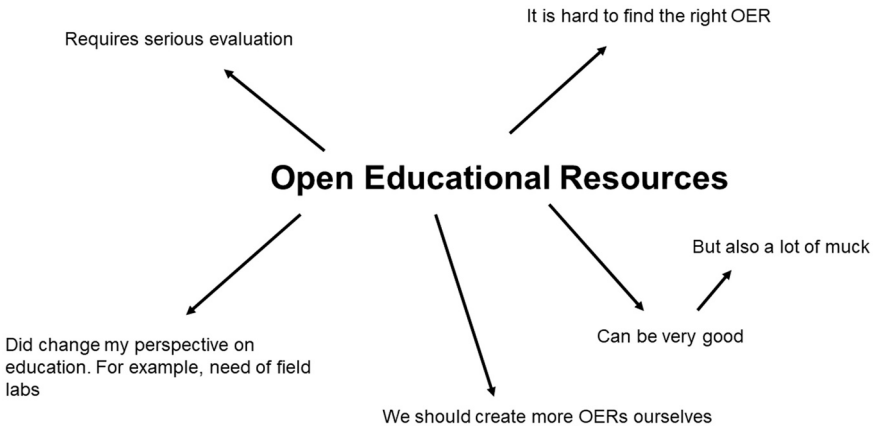


**Fig. 6.** Post map: Joe (BA).

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

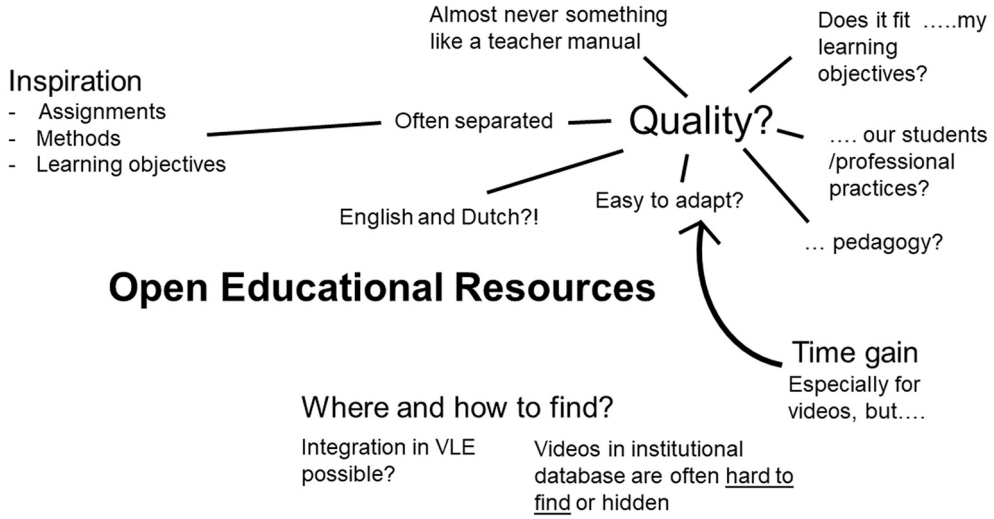


**Fig. 7.** Pre map: Rosa (RM).

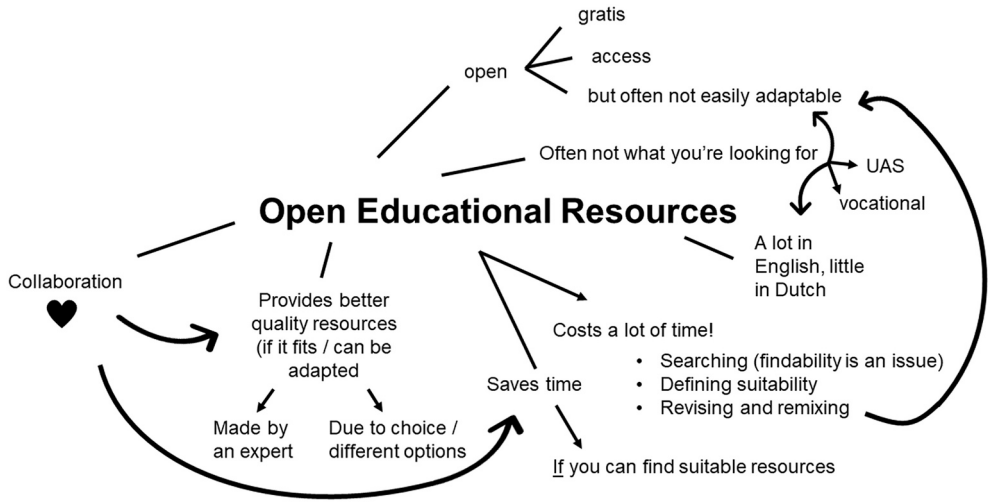


**Fig. 8.** Post map: Rosa (RM).

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.

## 6. 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.

### 6.1. 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, 2020). Another difference between existing rubrics and our findings relates to the legal and technical criteria for OER (Jung et al., 2016; 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, Coughlan, Stickler, & Astruc, 2020).

### 6.2. 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, Kreijns, Stoyanov, and Kalz (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, Hostetler, Freeman, & Stefaniak, 2020).

### 6.3. 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, Mishra, & Yayha, 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 Harmelen, 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 (2.1), 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, Doner, Robertson, & Gray, 2018), the Open Attribution Builder (Open Washington SBCTC, 2015), 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.).

### 6.4. 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 (Abramovich & Schunn, 2012; Hood, 2018), as well as to explore students' perspectives on OER quality (Schuwer, Baas, & De Ruijter, 2021).

### 6.5. 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.

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## Declaration of Competing Interest

None.

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## Appendix

### Appendix A

Overview of OER for each subject that were assessed by the participating teachers in this study.

| 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?siteID=SAyYsTvLiGQ-YF.eVw.fP0MyTilN9z66vA&utm_content = 10&utm_medium = partners&utm_source = linkshare&utm_campaign = SAyYsTvLiGQ |
| Research Method (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 |

*Note.* OT = Open Textbook; OOC = Open Online Course; OCW = OpenCourseWare.

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