

Peer Reviewing of OER in a Contested Domain – an Activity Theoretical Analysis

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Abstract

Globally, we experience numerous initiatives to increase the adoption of open educational resources (OER), but quality concerns challenge the adoption. In this study we present an analysis of the peer review process of an OER. The OER under review is produced by the European Commission (EU). It has the goal to teach children about farm animal welfare. Following discussions with the EU about its quality, a panel review was conducted. The group of peers used a quality evaluation tool for initial individual assessment, which was then discussed in four consecutive meetings. Video recordings from the meetings and the final report constitute the research data. Cultural historical activity theory (CHAT) was used as the analytical framework. The results indicated that the main areas of negotiations were the content quality of the OER and the adoption of the OER in teaching practices. The examination of these concerns using CHAT indicated that the peer review process neither leads to accuracy nor legitimacy. In summary, OER and in particular the quality assessment of OER challenge the boundaries of higher education. A combination of peer review and crowd source review is suggested to underpin the openness and thus increase adoption of OER.

The introduction of open learning is questioning the traditional view of knowledge as a commodity and learning as transmission of commodities. Open educational resources (OER) are part of a trend towards opening up higher education and seeing knowledge as a public good.

However, the adoption of OER is still low and challenged by a number of obstacles, particularly quality concerns (Atenas et al., 2014; Ochoa & Duval, 2009). New practices were developed as a response to low adoption, and the concept of open educational practices (OEP) was coined as “...practices which support the (re)use and production of OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path...” (UNESCO, 2011).

The changing focus from interactive online learning to knowledge creation through interactive online social negotiation, reflects a change of paradigm characterized by a shift in the use of Internet from the individual content provider, producing a product that can be distributed to others, which might be called the “Web 1.0”, to a network of content providers that not only are involved in interactive online learning but collectively develop, use and reuse OER in an iterative process of OEP (Auvinen & Ehlers, 2009), based on “Web 2.0” (O’Reilly, 2007).

The benefits of OEP are understood in the academic community, but academics have not yet embraced and realised them (Atenas et al., 2014; Camilleri et al., 2014). One reason is its disruptive character, which requires expertise, time, commitment, and institutional support (Atenas et al., 2014). OEP has implications: 1) for the conceptions of teaching and learning since

it respects and empowers learners as co-producers of learning (Ehlers, 2011); 2) for the teaching practices, since it explores the potential of using OER to transform educational practices (see e.g. Camilleri et al., 2014); and 3) for the quality assessment of OER.

In line with quality assessment in all the sciences (Albert et al., 2012; Smith, 2006), peer review is the preferred quality assessment instrument for OER (Clements & Pawlowski, 2011). Some researchers claim that by adopting peer review, this view on learning as a commodity can be seen as being reinforced (Kanwar et al., 2010). However, a peer review process not only approves the quality of the disseminated knowledge, it can also be seen as bridging the gap between creators and users (Engeström & Sannino, 2010). Since OER based on web 2.0 are constantly in flux and have a multitude of versions and authors (Camilleri et al., 2014), peer review of OER is only a snapshot of its quality.

Quality assessment in normative subject areas adds yet another level of complexity, because normative assumptions (on a scale from good to bad) can be debated. Individual reviewers bring with them underlying values which in normative subjects become their motives when they are involved in the negotiations with others.

The aim of this article is to analyse a peer review process of an OER in animal welfare, which is a normative and contested area with many different interests and interest groups. This analysis focuses on what is negotiated in the review process, and is an attempt to understand underlying values of negotiations and contradictions. Through this analysis, we wish to contribute to the debate on accuracy and legitimacy related to the quality of OER and to present an alternative method.

General characteristics of peer reviewing

It is generally accepted that peer review has three aims: (1) to maintain a certain quality standard such as identifying defects of originality and accuracy, (2) to give the work a stamp of quality through summative assessment, and (3) to improve the work through formative assessment (Smith, 2006). However, despite the fact that peer review is used routinely for various academic processes such as for allocating grants, publishing papers, and promoting and rewarding academics, it is not perfect. Smith (2006, p. 178) claimed that “it is compared with democracy: A system full of problems but the least worst we have”.

There are different views on how well this routine process is to be understood (Hylén, 2006; Kassier & Champion, 1994). Peer review in academic publishing can be described as a process when a third party, neither the author nor the editor scrutinizes the paper according to certain rules and makes a judgment whether the paper should be published or not (Smith, 2006). The process of peer review has been criticized for a number of reasons including that it is a) not standardized and objective, b) not reliable for detecting fraud, and c) time consuming and expensive (Smith, 1988; Smith, 2006). A strong evidence for bias against women when awarding grants has also been revealed (Wennerås & Wold, 1997), and reviewers have been found to steal ideas and block or slow down the publication of scientific results of competitors (Smith, 2006) and to suppress conflicts of interest (King et al., 1997).

In the recruitment of reviewers, there is a risk of conflict of interest when the reviewer is a competitor, conducting the same kind of research as the author (King et al., 1997), and therefore the editors seek peers in the same discipline, but with no or only vague connections (Smith, 2006). Authors and reviewers are encouraged to declare their conflicts of interest when the names of authors and sometimes reviewers are known to the other. Moreover, the

recruitment should ideally lead to a group of reviewers that are relatively equal in terms of power (Auvien & Ehlers, 2009).

Avoiding power asymmetry between reviewers is particularly important in interdisciplinary domains, where individual expertise required for competent evaluation across diverse fields is limited (Grainger, 2007), and in contested domains where the competences of the peers (King et al., 1997) and their values will affect the outcome. Thus peer reviewers should be people of equal social hierarchical level (Auvinen & Ehlers, 2009), yet as assessors they are claiming authority (Kelty et al., 2008).

The peer review process has also been applied as an external quality assessment of OER, as a check-approval procedure of a specific version before publication (Auvinen & Ehlers, 2009; Camilleri et al., 2014). However, a check-edit procedure, where the OER is published but under edition is more commonly employed (Camilleri et al., 2014). This procedure is a kind of open peer review conducted after publication, which has also been introduced for some scientific journals (Smith, 2006). Panel review might be a dynamic approach for innovation and development.

Theoretical framework

The study of peer reviewing is a study of a complex social process. Cultural Historical Activity Theory (CHAT) is used as a lens for analyzing peer reviewing and to better understand underlying values for the assessors' activities. CHAT, as conceptualized by Engeström (1987), studies both the individual and the social activities. The individual, the object, and the instruments, which constitute the upper triangle in the activity system are “the tip of the iceberg” as they represent the “visible instrumental actions” (Engeström, 1998, p. 79) (Figure 1).

The lower part of the triangle illustrates that the activities are carried out within a social context, and the relationship between subject and the community is mediated by rules and the relationship between object and the community by the division of labour (Engeström, 1987).

The rules, the community and the division of labour give structure to the activities at the systemic level (Engeström, 1987). However, these components in the activity system are not always visible at a systemic level but more tangible at a local level (Engeström, 1998). Sometimes the activities give rise to inner tensions and contradictions (Engeström, 1987). Engeström (2001, p. 134) has described a contradiction as “characterised by ambiguity, surprise, interpretation, sense-making, and potential for change”, and has proposed four levels of contradictions: Primary (within the nodes), secondary (between the nodes), tertiary (when more advanced object of activity is introduced), and quaternary (between the core activity system and outside activity systems) (Madyarov & Taef, 2012).

The peer review process is seen as an activity system in which the assessment of the quality of OER is the object of the activity and the report to the EU produced during the process is the outcome. The subjects are the peer reviewers and the instruments are represented by the OER and the assessment tool with its different criteria (Hays et al, 2005).

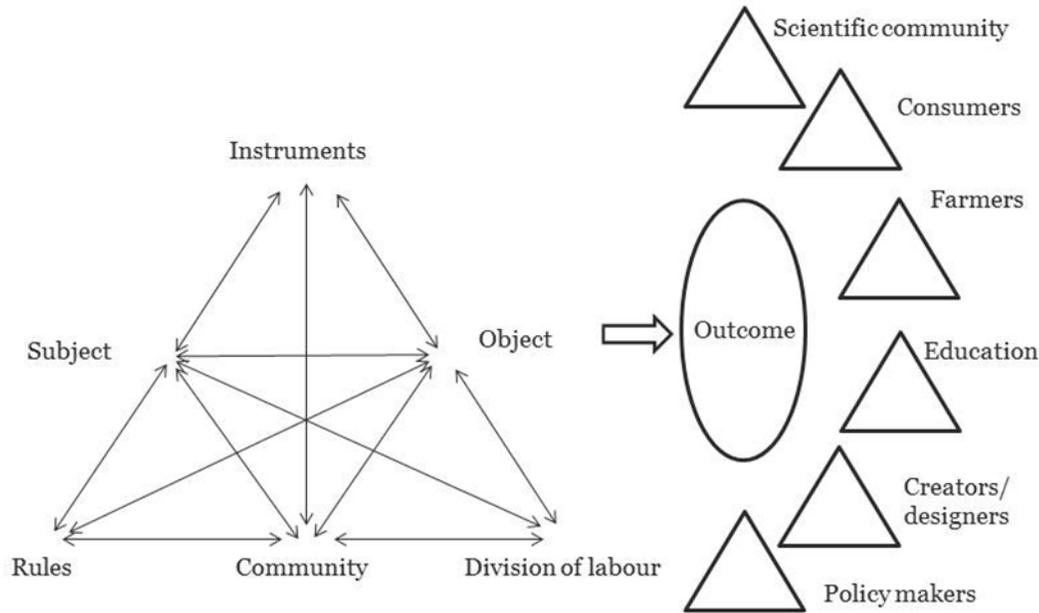


Figure 1. Activity system for the peer review process at the boundary to other activity systems (After Engeström, 1987).

The rules for the activity system are partly the preconditions set by the EU (e.g. that the target group for the OER is children aged 8-12 years) and partly negotiated between the peers (e.g. that the OER should be assessed both from the perspective of the target group and their teachers). Negotiations are coordinating mechanisms, which are central in situations when agency is distributed, when the object of activity is unstable and resists attempts at standardization, and when it requires rapid integration of expertise from various cultures (Engeström, 2008). Furthermore, negotiations do not have consensus or a “singular isolated compromise decision” as a goal, but rather leads to a negotiated order “in which the participants can pursue their intersecting activities” (Engeström, 2008, p. 16).

The division of labour is handled during the peer review process. Through negotiations, they harmonize their view on animal welfare, the OER, and the report to the EU; and multi-perspectives therefore give strength to the quality of the peer review process. However, the individual reviewers’ write their individual part of the report, where each member pursues their activities feeding into a collective.

The community is the interdependent aggregate of individuals who are directly involved in the activities. The peer reviewers act at the boundary of the central activity system and outside activity systems. The latter are the scientific community, consumers of animal products, producers of animal products, the educational system, the creators of OER and the policy makers, in this case the EU. These other activity systems have different rules, agencies, and motives, and therefore the reviewers need to handle a diversity of definitions of animal welfare, interpretations of the message from using the OER, questions of societal relevance, questions related to teaching, learning, pedagogies and ICT, and issues related to horizontal and vertical learning (Engeström, 2001). In OEP the same individual can be both creator and user, which is based on a high degree of openness (Camilleri et al., 2014) that offers horizontal learning. However, when the OER, as here, is only open in the sense that it can be used openly for vertical

knowledge transmission but does not give the user any right to make changes, it is based on lower degree of openness (ibid.).

Peer review is based on negotiations between the peer reviewers and the assessment is the object. CHAT can help to highlight the structural conditions for the peer-review as well as the contradictions and values within the system and at the boundaries to other activity systems. Therefore contradictions within the nodes, between the nodes within the activity system, and between the central and the outside activity systems are important for the analysis (Fig. 1).

Material and Methods

This study is based on a multi method sampling strategy. The OER chosen for the peer review is “Farmland” (<http://www.farmland-thegame.eu/>). Farmland is an OER for children, which since 2008 is available in 23 languages and has been created by Directorate General for Health & Consumers (DG-SANCO) in the European Commission, referred to as the European Union, EU.

Six modules on different animal species describe different kinds of production systems. It covers the basic needs of an animal. It also introduces welfare problems that are connected to animal production and a game. In the game, the player is introduced to Bérénice, who raises animals and delivers their products to the supermarket. The mission as a player is to help Bérénice to handle the animals, e.g. feed them or taking them through a track with different “obstacles”.

The data consist of videos of the four meetings between the reviewers as well as the different parts of the final report in order to a) provide a complete view on the negotiations that were going on in a peer review process, and b) understand the underlying values in such a process. To illustrate the findings, we have included excerpts from the interactions during the meetings and from the report.

The peer-review was conducted by six PhD-students and a process leader following discussions with the EU about its quality. These participants represented the community in the core activity system, and together they were regarded as a group of experts. The reviewers were recruited on a voluntary basis, after open advertisement to participate in the process. It was a heterogeneous group of mature PhD students with respect to location, gender, age, affiliation, and PhD subject and each reviewer was knowledgeable about the animal species they were responsible for in the assessment. The reviewers signed an informed consent.

Since the PhD students were placed in two different geographic locations the meetings were held every third week as video conference meetings and recordings were done by using the Cisco Jabber Video system. One camera in each location was used to record the participants and in addition participants could use screen and document sharing during the meetings. All the participants were accustomed to using this system as a regular means for work collaboration. Thus the recordings included at the same time video from two locations and the shared screen/documents and a notebook provided possibilities for the researcher to index the captured meetings.

Before they started the assessment the reviewers studied a set of scientific papers and guidelines using systematic methods to evaluate digital resources. At the first meeting, the reviewers discussed the text on the assessment of digital resources and decided jointly to use a quality evaluation tool developed by Hays et al. (2005), and the reviewers who wanted to combine this tool with other review protocols were encouraged to do so. Before the second meeting, they either individually or in pairs reviewed Farmland by using the quality evaluation

tool (ibid.) based on different criteria related to content quality and pedagogical quality. The evaluation scale for each of the criteria ranged from 1 to 5, and each of the scores were described in detail for each criterion. The reviewers wrote their part of the report (two worked together, four worked individually) on the different topics based on the scores and their experiences from their PhD studies and background. The reviewers therefore not only had a common understanding, they also found similar results when they individually and without affecting each other made assessments on the quality of the different parts of the OER.

Then the reviewers had three meetings in which they discussed the quality of Farmland and how the individual part of the report should be changed and combined into the final report to the EU. Each individual report was scrutinized by a fellow peer within the group of reviewers and the process leader. Their comments were presented and negotiated at the fourth meeting. After the individual reports were amended, they were combined into the final report. This report was communicated to the EU.

The four meetings between the reviewers, lasting 2, 3, 2, and 2 hours, respectively were video-recorded. Twelve excerpts from the four video clips were identified. These twelve excerpts were the only sequences where Farmland was discussed. The twelve excerpts were transcribed, and analyzed, drawing on CHAT as a conceptual framework (Engeström et al., 2002). We have chosen to highlight six excerpts from the videos that illustrate contradictions.

We used content analysis to analyze the final report to EU. Eight citations of relevance for the identified excerpts from the negotiations were identified. Each separate excerpt and citation from the report was treated as a natural unit of analysis. A code was assigned to each excerpt depending on the connection between components in the activity system. Finally, after all excerpts were identified and coded, the initial codes were merged into two new themes, 1) negotiations of content and 2) negotiations of context of use.

Results

From the four videos two themes were identified as focus areas for the peer reviewers' negotiations: (a) the content and (b) the context. The excerpts from the videos and the citations from the report can be found in the Appendix. Utterances and citations are marked with excerpt identification, number in negotiation, and identification of reviewer.

Negotiations of content

In the negotiations about the content, *facts and factual errors on animal husbandry and animal welfare made by the creators of Farmland were not subject to negotiation* during the peer review process. The reviewers seemed to take for granted that they agreed on these errors and that they had to be changed. Hence, they wrote carefully and in detail about these mistakes in the individual reports and argued for, with reference to scientific literature, why the changes needed to be done.

Rather, the negotiations in the review process generally *focused on underlying assumptions and values* of the content. The peer reviewers negotiate, in excerpt A, the purpose of Farmland and the learning objectives for Farmland in order to set the premises for their task. At the same time the group *re-negotiates the rules* by suggesting changes in the learning objectives and the purpose of Farmland. They realize that this not only has importance for the use of Farmland but also for the quality of Farmland, and therefore also for the peer review process.

The turn in utterance 04 “What do they mean with animal welfare friendly?” indicates that the reviewers do not understand the creators’ underlying definition of animal welfare. This affects the reviewers’ negotiations and the outcome. In the same utterance they also indicate that since the creators are not transparent about the purpose *there is a question about the agency of the creators* of Farmland. In utterance 05 the peers, therefore, suggest clarification of the purpose.

A crucial underlying assumption for Farmland is how the concept of animal welfare is understood, and the negotiations about this helped to constitute and strengthen the group's identity and culture. In excerpt B the reviewers have to handle that there are different definitions of the concept. The fact that this is not addressed in Farmland, and that the different parts of Farmland are based on underlying assumptions which are more or less surrounded by controversial opinions. In this excerpt the reviewers return to the *uncertainty of whether the creators may have had elaborate motives or if they lacked a clear intention* with the value-laden assumptions about animal welfare in Farmland.

Reviewer D in utterance 02 states that one cannot define animal welfare as animals that are not ill, and all the reviewers agree with this statement. In some parts of the world this view is not the norm but between the reviewers the belief is that the welfare of animals goes beyond that animals are healthy, which also reinforces their identity as a group of reviewers.

The producer or the creator can, through the selection of images, use their power to normalize a course of action or in this case a certain standard of animal production. In excerpt C the reviewers more specifically discuss the problem associated with misleading children by the use of photographs of animals. In this case, the reviewers are *gatekeepers not letting values slip through which normalize activities that are not acceptable to society* and in this situation even is violating the EU legislation.

In this negotiation, A accommodates in utterance 05 an anxiety that since the EU is authority, it can easily mislead users by their choice of visual material. Furthermore, this is mirroring the trust the users have for legitimate institutions, which also has the power to define the problems and formulate the agendas.

Negotiations of context of use

From the negotiations concerning educational practices it became obvious that the educational context is central when assessing quality. It highlights the importance of focusing attention on how OER aids the process of learning and how it meets particular user needs.

Excerpt D is a negotiation as to whether Farmland needs scaffolding, and how scaffolding should be conducted. The focus of the negotiations changed when reviewer A in utterance 02 takes up the problem that if the use of Farmland is guided by a teacher, the learning becomes dependent on the teacher's competence. The reviewers agree about *teachers’ lack of competence in the subject area, but they had different perspectives that become clear in the report*. On the one hand, it points at the necessity of a well-written teacher’s guide, including a list of additional resources, and on the other hand it underlines the importance of the teacher.

In utterance 02, A indicates that there is a catch 22 in the purpose with Farmland – it will teach farm animal welfare, but *it is such a complex subject that it needs scaffolding, a task teachers are not competent enough to undertake*. Three different solutions to the scaffolding problem are suggested: 1) clarify the role of teachers and further develop the teacher’s guide, 2) build in more scaffolding in Farmland, and 3) don’t use Farmland as a learning tool.

In excerpt E, utterances 1-4, the reviewers disagreed as to whether the game was enjoyable, and negotiated the *authenticity and values that permeate the game*. One of the underlying values in Farmland is that it is cool to rear animals and thus to produce animal based food products. Another is that farmers are encouraged to push the animals to produce food as fast as possible as long as the animal's health is not at risk.

While one of the reviewers, in utterance 03, says that she does not find the game enjoyable, she writes together with a peer that it has to do with them not being children and that the idea of a game is good. The peers *acknowledge the dilemma between seriousness and attraction to kids* that are used to play enjoyable games.

In excerpt F, the reviewers discuss differences between intended users and thus the risk of different interpretations of Farmland. The reviewers need to take into account different stakeholders, such as children, teachers, and their parents, and also the creators represent different cultures and underlying values.

In excerpt F the individual reviewers bring up aspects of *cultural differences, which they expect can lead to tensions and affect learning*, such as urban/nonurban areas (utterance 01), national educational systems (02), cultural contexts (03), and religions (04-06). E also criticizes that the creators underline the coolness by the use of glamorous animated role figures that are dressed gratuitous and sexist, with cheerful colours and sounds and high speed.

Discussion

The discussion is outlined as follows: Firstly, we discuss the identified contradictions and underlying values; secondly, we analyse the implications in relation to accuracy and legitimacy, specifically for Farmland and generally for the adoption of OER, as a type of interactive online learning.

The ability to handle complex negotiations is an important part of the peer review process. Three contradictions were identified, based on Engeström's four levels of contradictions (Engeström, 1987; Madyarov & Taef, 2012). These are: (1) primary contradiction within the object of activity, (2) secondary contradiction between the object of activity and the rules, and finally, (3) quaternary contradiction between the object of activity at the boundary to other activity systems (Figure 2).

No contradictions were identified at the tertiary level, where more advanced objects of activity are introduced, however, we discuss a more complex peer review process at that tertiary level under the heading accuracy and legitimacy.

1) Contradiction within the object of activity

In the peer review process we identified a contradiction between two intertwined concerns: The quality of the content and the quality related to the adoption and integration of the OER in teaching practices, which can be identified as the context.

The results of this study indicated that the negotiations primarily focused on the problems of assessing the pedagogical value of Farmland, exemplified by excerpt E, in which the reviewers discuss their need to put themselves into the children's situations. This contradiction between the content and the context of use of OER in peer review approaches to OER is widely discussed, since most assessments are conducted on OER separated from their intended use (Ehlers & Conole, 2010; Clements & Pawlowski, 2011) or localized OER studies do not provide

sufficient details about context, which makes generalization and reuse difficult (McAndrew & Farrow, 2013; Camilleri et al., 2014; Kirkwood & Price, 2014).

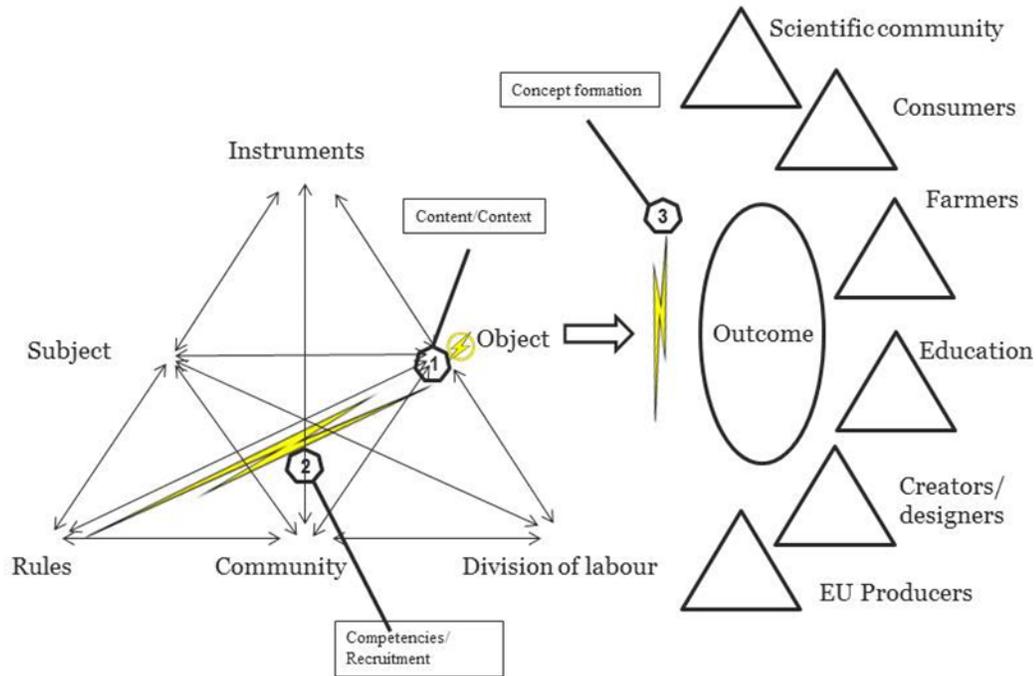


Figure 2. Activity system including the three contradictions.

When Wiley and Gurrell (2009) discussed the quality of OER they claimed that it had two dimensions: One that is context free and related to accuracy of the information, and another that has to be assessed in the context between a specific user and a specific resource since a user judges its legitimacy as an important asset for the perception of quality. In this paper, we define legitimate knowledge as socially robust knowledge that is not only assessed by individuals or limited scientific communities, but rather by much wider communities of knowledge producers, disseminators, traders and users (Nowotny et al., 2003).

One approach, adopted by MERLOT, is to subject the OER to professional review by editorial boards. It is an approach based on individual reviews that the editor generates into a 'consolidated review', which is published openly. MERLOT is a curated collection of free and open online teaching, learning, and faculty development services at the California State University. "It can be described as a referatory that provides metadata of the resources, which reside elsewhere usually in a university server" (Reisman, 2015). The approach that is analyzed in this study is similar to the approach at MERLOT, however the reviewers generate together the 'consolidated review', which is an approach that normally is conceptualized as a panel review.

Hence, it will only be able to validate the content; the value in an educational context cannot be assessed, only be articulated in speculative terms. Therefore, the reviewers' underlying values can have significance.

2) Contradiction between the object of activity and the rules

The rules that are the tangible and intangible conditions can, to various degrees, constrain or deliberate the character of the negotiations in both their form and content. As a consequence, the negotiations affect the rules, or at least their interpretation and perceived relevance. One

example is the negotiation about scaffolding in excerpt D. The reviewers negotiated if children should be able to use Farmland completely as a stand-alone or be guided by a teacher, and if teachers can use Farmland without guidance or need of a teacher's guide. Contradictions were identified in terms of scaffolding; one reviewer suggested that by changing Farmland according to the principles of constructive alignment, it could be used as a stand alone, another that it should not be a learning tool but rather used for entertainment, whereas the other reviewers underlined the importance of a well written teacher's guide, because you cannot rely on teachers' competences for scaffolding.

They also negotiated in excerpt B the dilemma related to communicating a simplified account of a subject area with a complex scientific foundation. This concern is strongly related to the dilemma of attractiveness to children, such as the game being joyful and based on cartoon avatars, versus serious games which are games used for purposes other than pure entertainment (Sawyer, 2003). Furthermore, they negotiated in excerpt A the children's motivations to use Farmland. In excerpt E the reviewers made it clear that they might lack the ability to see Farmland from a child's point of view, and some reviewers were clearly disturbed by the use of stereotype avatars and the male chauvinist appearance and expressions of these avatars. Excerpt E also revealed that they perceived that children in the game only learned the functions of the keys on the keyboard, which is known as operational learning (Becker, 2012).

It has to be borne in mind that the reviewers in this study were recruited on the basis of their content specific knowledge. However, they also reviewed the pedagogical quality, although no one had a background in educational sciences. Some collections of OER such as MERLOT only involve subject matter experts in the peer review process. However, these experts are also teachers and receive some training in matters of pedagogy. They are practitioners who must consider how/if something they are reviewing would be useful, etc., in their field. "However, the reviewers do not know how materials will be used when they are reviewed" (Reisman, 2015). The approach analyzed here is similar, since the PhD-students can be regarded as subject-matter experts that have some teaching experience, have received some training in pedagogies but do the evaluation separated from the use situation.

Disciplinary boundaries have been understood as limiting interaction, however, the academy is under transformation towards transcending disciplinary boundaries (Nowotny et al., 2003). In this study the reviewers assessed the pedagogical value although they did not have competences within the disciplines of educational sciences, children's learning, and serious games. They went beyond their area of expertise and assessed the pedagogical qualities of Farmland as if they had acquired tacit knowledge in this discipline through their teaching experience.

3) Contradiction at the boundary to other activity systems

Collective activity systems interacted since animal welfare is a contested subject area characterized by a multiplicity of stakeholders with conflicting interests. Commercially-driven cooperative industries generally have a profit motive of interest, animal activist communities have an empathy motive of interest, and consumer communities may have other motives. Thus, striving to share the same object, a mutual view on animal welfare (Algers, 2011) between multiple activity systems complicates the issue of power structures.

The reviewers acted at the boundary to other activity systems with different rules, motives, and agencies, which influenced their objects of desire, their activities, their negotiations and their shared object. Engeström has described that by operating in multi-activity terrains

horizontal learning can transform the activities (Engeström, 2007). As one example, the reviewers had to relate to the global scientific community of people conducting research and teaching in animal welfare. Excerpt B showed that these two peers were knowledgeable about the negotiations in the scientific community on the different interpretations of the concept of animal welfare.

The reviewers also needed to handle interpretations of the message from playing the game, questions of societal relevance, and issues related to impact and power. Since Farmland provides knowledge that can influence consumer choice and represents viewpoints that different stakeholders such as farmers probably disagree on (e.g. excerpt C), the reviewers acted at the boundary to their activity systems, too.

In the teacher's tool for Farmland it was stated that: "Farmland consists of a range of school-based and extra-curricular activities designed to promote issues surrounding animal welfare, from farm to fork". Thus the peer reviewers were also acting at the boundary to the activity system of education, with questions related to teaching, learning, pedagogies, and ICT.

Finally, the reviewers had to take into consideration the instrument producing activity systems for designing, creating, and producing Farmland. Every excerpt are expressions of the contradictions that exist between the central activity system and the instrument producing activity systems.

Accuracy and legitimacy

Contradictions have a potential for change (Engeström, 2001), and within this study we focus on the potential for the enhancement of accuracy and legitimacy through quality assessment. The analysis of the contradictions contributed to the understanding of the importance of values within the central activity system and at the boundary to the surrounding activity systems.

The contradiction at the primary level tackles the issue of the content of the OER. The content experts assess the content quality but feel to some degree uncertain about other quality aspects, such as pedagogies and children's learning, partly because they are not knowledgeable about the OER in its context. This concern calls for an assessment by people who are using the OER in educational settings. Legitimacy is about conforming to known principles or socially established or accepted rules and standards (Nowotny et al., 2003). As a supplement to peer review, which assesses scientific rigor, the society could be involved for assessing legitimacy.

The contradiction at the secondary level is related to the rules set for the peer review process. The community of reviewers co-construct the premises for the peer review process. However, the recruitment and the competence of reviewers neither guarantee the accuracy nor the legitimacy of the OER.

The contradiction at the quaternary level express that the subject area of animal welfare needs a process of concept formation. "Complex, consequential concepts are inherently polyvalent, debated, incomplete, and often 'loose'. Different stakeholders produce partial versions of the concept. Thus, the formation and change of concepts involve confrontation and contestation as well negotiation and blending" (Engeström & Sannino, 2010, p. 20).

Focus on quality assessment has traditionally been on how and not who should do the reviewing, but it has recently become a fairly common perception that the future quality assessment of OER will be conducted by a combination of learners and peers (Camilleri et al., 2014; Clements & Pawlowski, 2011). The issue of legitimacy questions whether higher education has the authority to be the main assessor of OER in the future (Auvien & Ehlers,

2009), and if peer review is the only and preferred methodology for quality assessment. It asks the question if the wisdom of the crowd and its demand for knowledge builds the legitimacy of OER and how that corresponds to the quality assessment of OER, and therefore how this might contribute to a sustainable development of society.

It can be argued that not only the reviewers but also the creators of OER have agency, which can be exemplified by their choice of images. Therefore, particularly normative subject areas such as animal welfare need a critical mass of users that can reflect upon the content so that flaws are corrected and activism stopped (Conole, 2010). MERLOT is an example of a referatory that is changing from purely peer reviewing to a combination of peer reviewing and crowd source reviewing (Reisman, 2015).

Using the lens of contradictions, we suggest an advanced object of activity, based on a combination of peer review and user-oriented quality assurance of OER, which can have the potential to resolve the contradictions between the activity systems. This is because that making it possible for other stakeholders to raise their voice about the shared object, the assessment of the quality, can decrease tension. The combination of peer review with more inclusive instruments for the users to assess quality has also previously been suggested (Camilleri et al., 2014; Clements & Pawlowski, 2011; Ehlers, 2006), but other studies have not analysed the process in such details.

Conclusion

Open educational resources are challenging the boundaries of higher education, and the quality assessment of OER is a contributing factor. This study has problematized the peer review process when conducted as a panel review. It identified three contradictions in the peer review of an OER in animal welfare. The first concerns the focus on content or pedagogical value, the latter is of particular interest for the adoption of OER and normally assessed by usability tests or impact studies, but the peers only assess the content or its accuracy separated from its intended use. The contradiction at the second level deals with the recruitment and the competence of reviewers, which neither guarantee the accuracy nor the legitimacy. The contradiction, which is identified at the boundary to other activity systems, questions the legitimacy because values and limited dialogue with society affect the assessment.

Further research should explore the inclusion of the users in quality assessment of interactive online learning and specifically of OER. Studies on the combination of peer review and inclusive instruments such as ratings and recommendations for quality assessment of OER in contested and value based subject areas will provide insight not only about quality but also about the impact of such approaches on adoption and sustainability. The findings confirm that peer review is not comprehensive for quality assessment of OER and that higher education does not have the authority to be the only assessor of OER. This study shows that peer review is a social negotiation of knowledge but that participatory instruments are necessary supplements for the evaluation of OER in order to contribute to openness for the society.

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Appendix

A	
01 B	“...And what is the purpose?”
02 E	“The purpose is to learn about animal welfare and farming for 8-12 year kids”.
03 D	“No, they actually have a more precise purpose in Farmland. I wrote it down. `You will learn about their lifecycle, their needs and the food they produce.
04 D	Here you have a chance to try rearing animals in an animal welfare-friendly way...”.
05 B	“What do they [the EU] mean with animal welfare friendly? Is it that everyone
C + D wrote	is supposed to follow the European minimum standards or should they strive to be above the minimum level...and they don't say anything about that”.
	“Yes, there we have a problem when evaluating this...which we need to address”.
	“We believe that the purpose is quite widely written and it might be good if it was broken down into more specific learning objectives (outcomes) so it would become clearer what they actually mean... We believe that this could help teachers that use this material in schools; to support other teachers, who are not so familiar with farm animal and welfare and to help them see better how Farmland fits into the curriculum. We also miss a statement in connection to the purpose about why it is important for children to learn about animal welfare. Understanding the relevance of purposes and learning objectives will probably motivate kids to learn more”.
B	
01 E	“The question is what an `animal welfare-friendly way' means, since they have not defined that”. (Everybody agrees).
02 D	“Farmland has a motto which is: `Respect health and quality for a happy farm' and then I actually miss the word welfare in the motto...health isn't welfare...we do have healthy animals that have quite poor welfare”. (Everybody nods).
C + D wrote	“What animal welfare is, i.e. what is important for an animal, and how it should be defined differs (Fraser et al., 1997; Veissier et al., 2008). Due to different definitions of animal welfare there can be conflicting conclusions how the animals should be treated (Fraser et al., 1997; Yeates, 2011).
C	
01 A	”There are pictures of tail-docked pigs...”.
02 B	“... after having seen a lot of pigs without tails, [kids] do not react to it and think it is normal...Perhaps they [the EU] did not even have the agenda to say that sometimes we cut the tails of pigs, but it results in people recognizing pigs without tails as pigs and thinking that this is what pigs always look like“.
03 A	“The message here is that we can't keep pigs in any other way because they are naughty...”
04 B	“Yes, this is weird”.
05 A	“Hmm, it is a tricky message...and one has to think `Who sends the message’”.
A wrote	(Everybody agrees).

	<p>“The message sent should be correct, present uniform information and in such way that the receiver is able to catch the message...slide 5 shows tail docked weaned pigs on a fully slatted floor without any straw, which is criminal according to Council Directive 2008/120/EC. This picture is not acceptable in instructions showing good animal welfare”.</p>
D	
01 D	<p>”F writes that Farmland should be used in a classroom teaching situation guided by a teacher, which I believe is plausible”. (F is not present at the meeting).</p>
02 A	<p>“I’m not sure that Farmland would be better off in a situation guided by a teacher because teachers most often are not so competent in animal welfare that they can take on that role. So, I think we need to add that the teacher should have that competence, but then we probably lose the whole idea of Farmland when one need that competence”.</p>
03 D	
04 A	<p>“Yes, that is absolutely true; it very much depends on the teacher”.</p>
05 D	<p>“There can be very different level in the learning, and for a good learning experience, I believe the teacher has to have extensive knowledge in animal welfare...one can be fooled by a pretty credible page and perhaps we can’t expect that critical an analysis by 12 year old kids and teachers who are not educated in animal welfare”.</p>
C + D wrote	
G wrote	<p>“And one really need to develop the teacher’s guide if you're going to highly rely on the teacher”. (Everybody agrees).</p>
F wrote	<p>”The teacher instructions could be developed further to enable teachers who are not sufficiently educated in farm animal life cycles and welfare to help children in the learning process...Teacher instructions should be on a more detailed level ... so they can give children meaningful feedback and have good discussions. It would also be good if the teachers could have a list of resources (both literature and experts from relevant fields) that they use as sources whenever they might need more information while helping children out in their learning process”.</p>
	<p>“To construct the game as a course on broiler production according to the principles of constructive alignment could improve the learning outcome of the players...The learning outcomes and a background presentation may function as an introduction to the subject for the teacher”.</p>
	<p>“Farmland is more of a material than an e-learning courseware, and more of a fun event in a course than an actual learning tool. It can, however, present a nice pause for the children if working with farming projects as it might be used to raise a discussion of animals on farms. However, the courseware should not be used as fact-providing courseware for children”.</p>
E	
01 G	<p>“I don’t see the learning outcome of the game...Is it that one has to feed the chickens...feed, water, feed, water, feed, water. And for the pigs, to move them quickly from grass to straw...I mean, how many pigs live on grass...I don’t know...it’s a fun game, I have played all levels, but I expected it to have a deeper meaning...”.</p>
02 F	
03 D	<p>“I also found the games fun but it is not about animals, it’s about colours...it does not make kids think about the animals but it’s just about colours...you</p>
04 F	

05 D	don't see if the animals are suffering or are unhealthy...".
06 B	"Actually, I don't even think that the game is fun. I must admit..." (the others are laughing).
07 D	"You are so serious...". (Still laughing).
08 F C + D wrote	"It was quite frustrating...eh...one reason, there were many, was that I did not manage...I'm probably not as good as a 10-year old [playing games] but I could not understand why I did not manage...for example every time a chicken met another chicken they started to fight... chickens must be very angry birds!" (Laughs).
	"Yes, indeed it does send an awkward message...".
	"Yes, it does, and I never understood why I did not succeed. Nowhere in Farmland it said what one has to do in order to succeed to reach a level and go to the next level". (Others agree).
	"So it's like, oh I was lucky...oh I succeeded".
	"We are, however, concerned that [Farmland] is a little bit too 'flashy', which could take away focus from the main message...A game that includes a competition part can be fun to play and a way to motivate the learners and engage them into the subject. So the idea with a game is good, but we are questioning if this particular game is fulfilling mentioned above educational objectives...We are not 8-12 years old so we might lack the ability to see the game through a child's eyes...".
F	
01 C	"There are so many differences between how children are educated, which we need to take into consideration. For example between urban areas and the countryside...".
02 F	"...in some countries you have contact and respect for animals and nature
03 B	whereas in other countries you don't have that, and when you develop material like Farmland you have to think that kids have different experiences and
04 D	views".
05 B	"How students perceive teachers is also different. In some countries what the teachers says is law whereas in this part of the world it is not really, it's
06 A	something you think twice about if you need to care about or should obey or
07 B	not...".
E wrote	"What does a Muslim think about the girl in Farmland running around in her little skirt?"
	"Yes, this is something to think about, if the kids are offended about it or if their parents don't think they should look at it".
	"...or what Muslims think about the caring of pigs for that matter...".
	"I think that we can conclude that it is not easy to take all these things into account, but we have to reflect upon it in the evaluation...".
	"All the characters look like northern Europeans. The young girls are slim and stylish. Two of the men, one a former formula 1 driver and the other a soldier, look like bodybuilders with a very macho image. The soldier presents himself as the hens' fitness trainer and calls them 'little beauties'...The sound is loud and pulsating and very stressful, not sound that usually associates with farming environment".