

EDUCATORS' OPEN EDUCATIONAL COLLABORATION ONLINE: THE DILEMMA OF EMOTIONAL OWNERSHIP

Abstract. The open education movement has witnessed ups and downs from initial interest in transparency and openness, followed by a lack of reuse of open educational resources (OER) and the massive boost of interest in massive open online courses (MOOCs). This article addresses educators' online behaviors and perceptions regarding participation in collaborative development of OER in online settings. Using a data-driven approach to study educators' perceptions, this article presents multiple considerations for collaborative OER development and validates a new model explaining educators' intention to participate in collaborative action. The findings reveal the contradictory nature of emotional ownership of knowledge: a critical enabling factor for commitment and a barrier to knowledge exchange in an open and transparent manner. The findings also show how outcome expectations regarding increase in reputation and status in the network do not influence the intention to share knowledge. Further interviews with idea-sharing platform users enable us to explain the favorable settings to resolve the dilemma of emotional ownership. The study contributes not only to further development of the open education movement but also to theory development of educators' collaborative behaviors online.

Keywords: open educational resources, knowledge exchange, emotional ownership, idea sharing, virtual communities

1. Introduction

A 'digital revolution' is taking place in the field of education as the uptake of technology is redefining how people teach and learn. Considerable effort has gone into open education initiatives aimed at broadening access to the learning and training traditionally offered through formal education systems. In the context of higher education, the rise of open education, and, more recently, massive open online courses (MOOCs), has led many universities to reconsider their institutional strategies and engage in new learning practices (European Commission, 2013).

The rise of the open content movement is creating a new window of opportunity for educators and trainers to exploit open educational resources (OER), ranging from simple digital teaching assets to full courses, and related practices to secure the effective utilization of the resources (Tuomi, 2013). According to Kanwar et al. (2010), the mere use of OER is not enough to stimulate real change. Instead, vibrant

discourse and practice must be developed so that OER can be embedded in the educational environment.

Despite the promise of OER, their increasing availability and a growing collection of good practices and application guidelines, collaboration and peer support in the development and reuse of OER remain low (UNESCO, 2016; AbuJarour, 2015). Some challenges exist, mainly linked to questioning the quality of OER (Clements and Pawlowski, 2011) and aligning resources to the specific needs of each classroom (Tsai and Shen, 2014; Downes, 2007), but also associated with fundamental social inhibitors and motivational barriers, namely, the unwillingness to share or use resources produced by someone else (Pegler, 2012; McKerlich et al., 2013; Pirkkalainen and Pawlowski, 2014).

A key problem therefore exists: How can participation in the development and refinement of OER and related practices in an open and transparent manner be stimulated online? Auvinen and Ehlers (2009) argued that collaborative development of open education can produce a virtuous cycle of quality improvement through a continual cycle of perpetual peer-creation and peer-validation, which ultimately contributes to the development of an open education culture, as described by Ossiannilsson and Creelman (2011). As the number of dedicated online spaces for collaborative OER development grows (Nikolas et al., 2014; AbuJarour, 2015) and many early adopter-educators are taking a role in participatory knowledge production of new educational resources and services (Okada et al., 2012; Monge et al., 2009), further research is needed to study the favorable conditions for such participatory action and to identify and address the major obstacles behind the open education movement.

This article addresses the identified gap with an in-depth technology adoption study to understand the preferable conditions for educators to contribute online in collaborative development of OER and ideation of effective practices for their utilization. The data-driven study investigates the influencing factors that affect educators' perceptions of open educational collaboration online. We especially look at collaborative efforts starting from the exchange of ideas in virtual communities that utilize collaboration tools and aim for transparency and equal access for like-minded collaborators. For the sake of clarity, our scope of OER includes open educational practices for the effective utilization of OER. Using rich data on the interests, needs, intentions and online behavior of educators, the study presents

multiple considerations for collaborative work in online educational communities and validates a new model that elicits educators' behavioral intention to engage in open educational collaboration in virtual communities.

Our study provides a theoretical contribution by uncovering the critical influencing factors that can enable and even inhibit participation in specific online contexts. This study finally provides an explanation for both perspectives. As a practical contribution, this article serves as a discussion opener for further development of open educational knowledge-sharing practices that are not simplified to the dimensions of merely open and closed collaboration.

The paper is structured as follows. We first describe the theoretical background regarding open education and the related unit of analysis, educators' perceptions of online collaboration regarding new educational resources and related practices. The basis of our study is set by a data-driven approach, acquired with a rich qualitative study. The paper proceeds with a quantitative confirmatory section to validate the developed research model and finally presents further insights for discussion with supplementary interview data.

2. Theoretical Background

2.1 Reuse and adaptation of open educational resources

Open educational resources, originally defined as “the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for noncommercial purposes” (UNESCO, 2002), have been considered the key ingredient of open education (OPAL, 2011; UNESCO, 2016; UNESCO-COL, 2011). With a growing number of open repositories offering free digital content for teaching, learning and research (course materials, textbooks, streaming videos, multimedia applications etc.), a plethora of examples exists for motivated individuals and organizations engaging in the production of OER (Pawłowski et al., 2012; Downes, 2007).

The OER ecosystem has been the focus of scholarly research throughout the past decade. Numerous influencing factors affecting OER adoption, use and creation have been identified and reported in the mainstream literature (UNESCO, 2016; Clements and Pawłowski, 2011). As digitalization breaks through, several initiatives and projects have emerged to support the creation, collaborative development and sharing of OER as well as open educational practices (OEP), that

is, didactical approaches and scenarios (OPAL, 2011; UNESCO-COL, 2011; Okada et al., 2012; AbuJarour, 2015). Collaboration by educators or teachers is often facilitated in virtual communities that form under specific topics of interest in online platforms and sites (Chen et al., 2014; AbuJarour, 2015; Pawlowski et al., 2012; Okada et al., 2012). Chiu (2006) further described how virtual community members are brought together not only by shared interests but also because of shared goals. Some of the key activities in virtual communities are the exchange of ideas, to spark conversations and to find common ways to turn ideas to real solutions (Tang and Ding, 2014; Chiu et al., 2006; AbuJarour et al., 2015). Such activities are the focus of this study.

Despite the efforts of several initiatives to facilitate open educational collaborations, the overall uptake and reuse of the resources are low (Ochoa and Duval, 2009; AbuJarour, 2015). Online environments that facilitate OER delivery, as well as social forces and the organizational context, play a key role in the implementation of the OER lifecycle. Similarly, the joint development of OER in online settings, the sharing and reuse of content, cannot be examined solely from a technical point of view (Pirkkalainen and Pawlowski, 2014). A holistic examination and an in-depth analysis of educators' open educational behaviors online are required to explain the bottlenecks hindering the movement.

2.2 Influencing factors of collaborative OER development

A variety of influencing factors have been identified in studies regarding the uptake and usage of OER (Pegler, 2012, Pirkkalainen and Pawlowski, 2014). Typical barriers include social, organizational, technical and legal barriers. Some of these barriers also address motivational and emotional aspects such as bad previous experiences, attitudes toward systems or work preferences (Pirkkalainen et al., 2014). Although researchers have advanced the understanding of general enablers and barriers to OER use, less effort has been spent studying specific OER-related phenomena, in particular engagement in collaborative OER development.

Our study focuses on a data-driven approach to identify influencing factors of educators' engagement in collaborative OER development. In parallel to the qualitative part of the study, we have carefully reviewed existing literature regarding the key concepts that influence OER collaboration. For the sake of clarity, the key influencing factors that emerged from the data will be briefly described in this section.

Emotional ownership describes the degree to which individuals or groups perceive the knowledge or resources belong to them (Pawlowski, 2012; Heider, 1958). The concept is strongly linked to psychological ownership of groups or jobs (Van Dyne and Pierce, 2004) and even immaterial possessions and knowledge (Pierce et al., 2003). In research work on OER, emotional ownership is discussed as a driver for OER engagement but also as an outcome of OER development.

As the second concept of our study, **personal outcome expectations** for knowledge sharing could have a strong influence on online participation (cf. Bandura, 1986). In this study, educators consider what kind of short- and long-term benefits they might have when they contribute their knowledge online.

A third factor is the **affective commitment to the community**. The engagement of users (e.g., in an open source setting) depends on how connected and attached they feel to a certain group (Bateman et al., 2011). The concept has been addressed from various perspectives and magnitude, for example, classified into strong and weak ties with community members (Granovetter, 1973) as well as the affective commitment influencing online behavior (Bateman et al., 2011).

Finally, **preferences for and experiences of knowledge sharing** could play an important role in OER development. This aspect looks at the preferences and attitudes of educators in the collaborative development of OER. Such preferences are often influenced by previous successful and bad experiences in knowledge-sharing activities.

As a summary, a variety of factors influence OER uptake in general. It is necessary to deepen this knowledge by focusing on specific parts of OER development. Thus, our study aims to understand what aspects enable educators' behavioral intention to collaboratively develop OER and to share their creative minds in the form of ideas with their collaborators. Collaboration in the context of this study involves the **virtual community** perspective (Tang and Ding, 2014; Chiu et al., 2006) consisting of joint development of ideas for new resources and services. The collaborative activity is operated in an online environment (virtual community) where participation is not restricted (open education principles apply) and thus may involve interdisciplinary discourse and interested actors from diverse settings (between diverse academic institutions, involving third parties etc.).

3. Developing a Model Based on Rich Qualitative Data

As collaborative development of OER and related practices in virtual communities is not yet a common practice, our study first was aimed at gathering rich qualitative data to understand what aspects influence educators' intention to open up their educational ideas to others' contributions. We chose the data-driven approach as qualitative methods can provide context-specific knowledge and deep understanding of unmapped topics (Venkatesh et al., 2013). This qualitative data gathering served as the basis for the creation of a new theoretical model that is then validated and discussed in this article.

3.1 Method of the qualitative part of the study

We undertook a two-step approach to collect the qualitative data to build a model. We first organized several focus group sessions throughout Europe to discuss the perspectives of educators and professionals who deal with higher education. A total of 64 participants participated in six focus groups during early 2014 (see Annex 1 for full details of the two-step approach). Focus groups are group interviews designed to explore and contrast the knowledge and experience of the participants in a discourse (Kitzinger, 1999).

The sessions included discussions about online collaboration that is facilitated from idea exchange about new open educational resources and practices. The contents of each session were planned and agreed upon with six researchers who moderated the sessions. The topics of interest that served as the starting points of discussion were as follows:

- In what situation would you share your ideas online?
- Who would you share your ideas with online?
- How are ideas best expressed online?

The guidelines for inductive theme formation and qualitative data analysis by Mayring (2002) were followed. The following themes were extracted from the data:

- The foreseen benefits of educational idea sharing
- Collaborators' shared goals and objectives
- Educators' preferences
- The emotional and affective perspectives to ideation

- Early engagement and creativity
- The organizational practice as an enabler or restrictor of idea sharing

We applied theoretical sampling and allowed the data to guide our analysis. As the investigation regarding focus groups resulted in fragmented understanding and further evidence was needed, follow-up interviews were conducted. In this second step, semistructured interviews allowed us to reach a deeper understanding of the topics with selected participants of the focus groups. We chose to proceed with aspects we did not find explanations for in related literature. We conducted 11 interviews between April and June 2014 (see Annex 1 for descriptive information). We generated open codes (Strauss and Corbin, 1990) based on our data. After careful content analysis of the transcribed and coded data, further explanations were mapped to the existing themes. This step led us back to the related literature. With the help of previous theories, we were able to maintain a data-theory fit and ensure our analysis is placed in the relevant theoretical framework and is well justified. We aimed to understand to what extent participants are active in educational collaborations, whether they apply or create OER and have or are willing to participate in the collaborative development of such. The focus groups and interviews revealed a number of previously discussed issues of barriers to OER adoption in higher education (e.g., integration in the curriculum, intellectual property rights issues), which we will not discuss in detail in this study. These insights together with the related literature lead to the formulation of a set of hypotheses that are tested and discussed in this article.

3.2 Hypotheses

The data-driven theoretical model of the study is presented in this section.

Emotional ownership

Our focus group discussions highlighted how delicate it is to expose the ideas we possess in a virtual community that strives for openness. First, knowledge sharing based on ideas worthy of exploration requires a creative mindset. Our data informed us how critical it is that an educator perceives the ideas as his or her own to exchange thoughts on those. Participant 1 stated, “If I feel strongly attached to the ideas.” Participant 4 observed, “I don’t feel ownership of what someone else has prepared.” Educators elaborated that it is critical that some kind of bond emerges in the educational resources they develop. Our analysis revealed that educators

grow an emotional bond and get quite strongly attached to the resources and knowledge they create and possess.

Perceptions of ownership have been discussed in related literature, but the extent to which they influence knowledge sharing and, especially, educational collaborations, has not been studied. For example, the concept of psychological ownership has been linked to perceptions of ownership and possessions regarding group or job among others (Van Dyne and Pierce, 2004). Heider's (1958) earlier work recognized ownership of ideas in relation to scientists' inventions, but this idea remains untouched in the educational domain. Pierce et al. (2003) elaborated how individuals are likely to generate feelings of ownership of what they create if they have used energy and mental effort regarding the object.

Jarvenpaa and Staples' (2001) study investigated the perceptions of ownership of information and expertise but from the point of view that the knowledge created belongs to the organization, not to the person. Further, none of the studies on psychological ownership, from the viewpoint of possession and ownership of the knowledge created and owned, has investigated how these perceptions affect individuals' knowledge-sharing behavior.

Based on the analysis of the data, we focus on the ownership of ideas as perceived by an individual instead of a group (our unit of analysis was the educators' perceptions). As emphasized, ideas were viewed as something personal, and an emotional bond to those ideas was present. Therefore, we discuss this important influencing factor in this context as *emotional ownership* that is the degree to which a person perceives the knowledge or idea belongs to him or her. We hypothesize that emotional ownership is a strong enabler of educators' intention to participate in collaborative development of OER in a virtual community. Additionally, the focus group discussions highlighted that sense of ownership is closely linked to the anticipated benefits. "If I feel strongly attached to the ideas, I will most likely contribute more. It is also about trust, also about benefits" (participant X). Thus:

H1: The emotional ownership of ideas positively influences the intention to engage in open educational collaboration.

H2: The emotional ownership of knowledge positively influences the outcome expectation for knowledge sharing.

Outcome expectations for knowledge sharing

One of the most frequently discussed topics within our focus group sessions was the benefits of contributing to or initiating educational collaboration, regardless of whether this takes place in an online environment or not. The participants emphasized the long- and short-term benefits. They should be strategic and contribute on the personal and organizational level. Our interviews pinpointed that the types of organizational benefits are critical in an online environment related to one's position in a certain community or network, even beyond the organizational boundaries. Although the lack of immediate benefits was seen as a key barrier to idea sharing, a lack of realistic objectives for the collaborative activity further shows the need for long-term benefits.

Similar findings were discussed in the knowledge-sharing literature three decades ago by Bandura (1986). However, given the importance of such outcome expectations, we include them in our theoretical model and theorize that such strategic benefit expectations become a critical determinant why educators would participate in online educational collaboration. Thus:

H3: The outcome expectation for knowledge sharing positively influences the intention to engage in open educational collaboration.

Emotional attachment to the community

The qualitative data analysis resulted in identification of another important emotion- and attachment-related enabler of educational collaboration online. Once a virtual community based on a certain idea or topic is established or joined, the ties between educators have a huge influence whether the collaboration is realistic or not. Educators elaborated in our focus group sessions and in the follow-up interviews how idea sharing in their daily work usually takes place in a safe and trusted environment with closest peers and colleagues, such as in research groups. However, when that boundary is bridged and additional stakeholders become involved, the structure of that network and who is part of it are critical for deciding to share ideas, no matter whether long-term benefits are realistic. To this end, the intention to exchange ideas and outcome expectations are likely to be formed once network structures are realized.

Educators in our study also discussed how important it is to identify oneself as a member of a particular group where knowledge is exchanged. This line of argumentation has been discussed from various perspectives regarding strong and weak ties (Granovetter, 1973), such as for interpersonal perspectives in relation to

social capital (Nahapiet and Ghoshal, 1998). Bateman et al. (2011) discussed how affective commitment is an important part of an individual's participation behavior online. Based on these findings from the knowledge-sharing literature, we theorize that affective commitment to other collaborators positively influences the intention to share.

H4: The affective community commitment of collaborators positively influences the intention to engage in open educational collaboration.

The analysis also led to the understanding that once we feel an emotional bond to our collaborators, we are more likely to accept ideas that might not be our own. One of the focus group participants elaborated: "Strong connections are required to activate the group." The respondents argued that one should not only feel that his or her own ideas are worth standing behind and pursuing further, but the ideas shared by other members of the virtual community might become very close to oneself, even to the extent of perceiving joint ownership through collaboration about the initial idea. Our analysis indicates how this is partly facilitated by an affective commitment to the collaborators, and thus, we hypothesize:

H5: The affective community commitment of collaborators positively influences the emotional ownership of knowledge.

Preferences for and experience in knowledge sharing

A vast amount of research on OER and knowledge sharing in virtual communities has focused on varying perspectives on an individual's own preferences, tendencies and behaviors online. Therefore, it was not surprising that these issues emerged from the analysis. However, these considerations could provide validity and vital explanations for understanding educators' knowledge-sharing behavior and should therefore be included in our study.

The discussions with educators with varying backgrounds revealed various tendencies, highlighting the different perspectives individuals have on collaboration. These differences are related to preferences for the collaboration modes (e.g., synchronous to asynchronous, the preferred media), as for objective vs. problem-oriented collaboration. Regarding collaboration with a creative mindset (once ideas are exchanged), the most prominent in our data was the willingness to engage online to exchange ideas that still leave room for creativity and interpretation. Many of the participants did not enjoy such brainstorming as they were not used to handling it in an online environment. Many further elaborated

that such activity might increase ambiguity. Additionally, not all who had experience developing ideas for open educational resources wanted to create them collaboratively with their peers, or even further, in a transparent and open manner with wider communities. Some of the participants had already been engaged in such collaborative OER development activities and seemed more positive about doing it in the future as well. Thus, we hypothesize that the preferences for exchanging ideas online, preference for developing OER in a collaborative manner, as well as previous sharing behavior, influence the intention to engage in open educational collaboration.

H6: Preferences for and experiences exchanging ideas online positively influence the intention to engage in open educational collaboration.

Our analysis indicated that those who have been engaged in collaborative OER development and sharing their ideas beyond their strongest ties were more positive about collaborating ideas. We contend that these individuals are likely to build an emotional bond with ideas more easily than those with less experience.

H7: Previous online knowledge experience positively influences emotional ownership of knowledge.

Pierce et al. (2003) and Dittmar (1992) showed how individuals' self-awareness and stimulation are positively influenced by attachment-related perceptions. Once committed to the work we do, we are likely to become committed to the groups we work with and the objectives shared by such groups. Based on the qualitative findings, we further argue that those who enjoy brainstorming and collaborating on ideas online are exposed to an increasing amount of interaction and, thus, build affection toward the community and become more sensitive to realizing the expected benefits of idea sharing. Thus, the following two hypotheses are stated:

H8: The preference for exchanging ideas online positively influences the outcome expectation for knowledge sharing.

H9: The preference for exchanging ideas online positively influences the affective community commitment of collaborators.

Our focus groups and interviews revealed issues beyond these emotional, preference and experience-related personal factors. Additional organizational aspects were discussed that can shed light on online knowledge-sharing behaviors that are operationalized as the control variables of the study.

The organization (university or other educational institution) can be an enabler or an inhibitor of collaboration on educational resources in an open and transparent manner. Based on these findings that are in line with existing OER research (e.g., Downes, 2007; Atkins et al., 2007), we chose two control variables:

1. The extent to which the organization allows educators the initiative to participate in collaborative activities beyond organizational boundaries, and
2. The extent to which the organization is aware of and supports employees in OER use.

The theoretical model explaining intention to engage in open educational collaboration in virtual communities is presented in Figure 1.

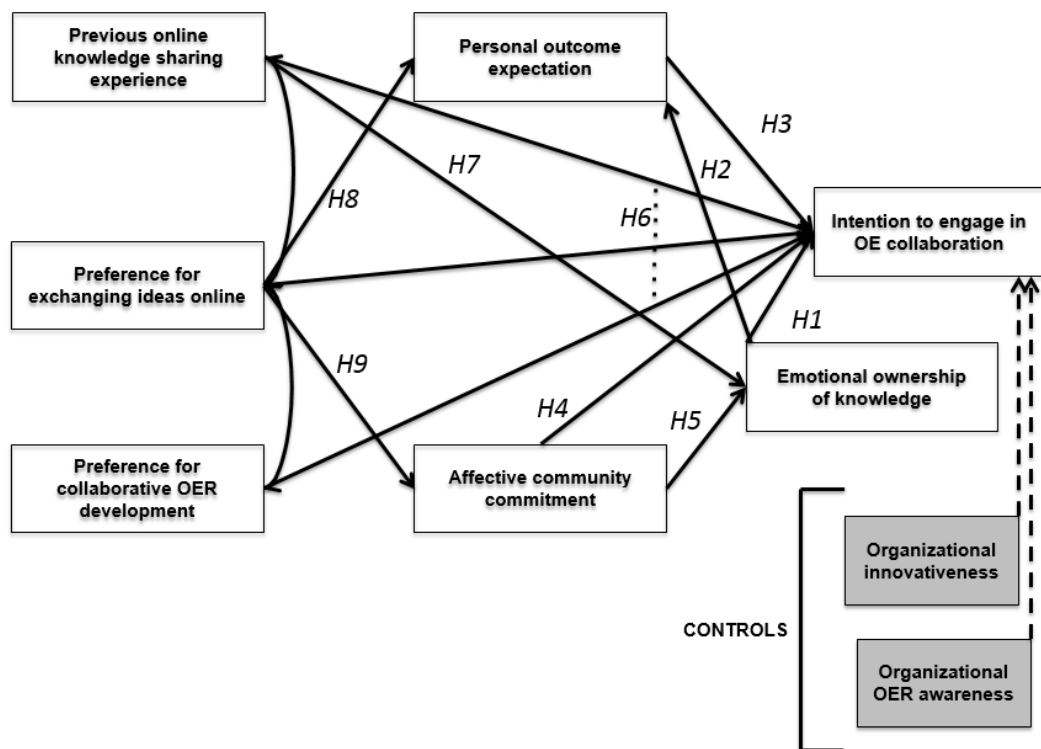


Figure 1 Theoretical model

4. Method

The remainder of the article reports the confirmatory phase as the theoretical model of open educational collaboration is validated. The primary source of validation data is collected via a survey. We also utilize secondary sources of data through log analysis of an online environment for idea sharing and additional interviews. These secondary sources can provide additional explanations for educators' knowledge-sharing behavior.

4.1 Data collection

Primary data

We used the survey data to test our theoretical model. We selected the virtual community context since we were interested in developing ideas for educational resources in an open and transparent way. We especially were interested in the perspectives of educators who have had at least some experience in using and developing OER. We also expected these educators to have a contractual obligation either in universities or other educational institutions. We welcomed company staff who had an educator role in the organization. The requirement for the work contract was set because of our control variables that entail a contract.

We focused the survey on self-reported data on the educators' perceptions of knowledge sharing in an open manner. This would allow us to observe their experience, preferences, expectations and emotional aspects in online settings. Our main source of data collection was an online environment dedicated to idea sharing for new OER and courses (REMOVED FOR BLIND REVIEW). However, we did not want to limit the investigation to a specific site as idea sharing usually takes place in various sites the individual commonly visits (Füller et al., 2010). Thus, the survey was distributed through various professional virtual communities ranging from Facebook groups to Researchgate and Twitter.

A total of 241 responses were collected through the online survey tool Survey Gizmo. As expected, most of the educators did not have previous experience in or required awareness of OER, which, in combination with data screening for incomplete answers and the removal of students and other respondents who did not fit the scope of the study, led to final 100 responses that were selected for the study. In terms of demographics, 60 respondents were researchers who are active in teaching, 8 were PhD students who give lectures, 24 worked as educators at non-university organizations, and 8 were educational specialists, trainers or designers. Approximately 50% of the respondents were northern European and the rest from North America, Asia and southern Europe. More than 50% of the respondents were between 25 and 40 years old; the youngest was 20 years old, and the oldest was 68 years old. Fifty-two (52%) were female, and 48 (48%) were male.

Supplementary data

Six follow-up interviews were conducted to find additional explanations for the dilemma of emotional ownership. The purpose was to apply the theoretical

sampling approach to uncover missing details and therefore to understand the actual behavior of educators in open and voluntary settings. We addressed actual users of an idea-sharing platform. The tool designed for the collaborative development of educational ideas (REMOVED FOR BLIND REVIEW) supports collaborative OER development between interested peers. The platform supports closed collaboration as fully open and transparent sharing, which allows anyone to join, and thus enabled us to study the differences between open and closed knowledge exchange.

4.1 Measures

The qualitative part of our study resulted in seven influencing factors on a personal level and an additional two on the organizational level (control variables; Table 1). For some of the constructs (although they have been researched to some extent), we did not find any existing scales to adapt for the study at hand. They included emotional ownership, preferences for exchanging ideas online and collaborative OER development, as well as organizational OER awareness.

Table 1 Constructs in the study

Construct	Definition	How measured
Intention to engage in open educational collaboration online (INTOE)	Individuals' behavioral intention to participate in collaborative development of OER online	Adapted from Venkatesh and Bala (2008)
Emotional ownership of knowledge (OWN)	The degree to which a person perceives the knowledge or idea belongs to him/her	New scale developed
Personal outcome expectations (networking and reputation) (OE)	An individual's belief that task accomplishment leads to a beneficial outcome in terms of reputation and networking	Adapted from Chiu et al., (2006)
Preference for exchanging ideas online (PEI)	Individuals' preference to expose their early and not-fully-thought-through ideas to others' contribution	New scale developed
Affective community commitment (ACC)	Emotional attachment to, identification with and involvement in the group	Adapted from Bateman et al. (2011)
Previous online knowledge sharing experience (EXP)	The degree to which a member has conducted idea and knowledge-sharing activities in virtual communities	Adapted from Davenport and Prusak (1998) and Lin et al. (2009)
Preference on collaborative OER development (ENJ)	The degree to which a person prefers collaborative OER development	New scale developed
Controls		
Organizational OER awareness (ORGOER)	The degree to which the organization has recognized and supports OER use	New scale developed

Organizational innovativeness (ORG)	An organizational climate that is tolerant of failure and within which information freely flows	Adapted from Bock et al., (2005)
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The dependent variable of the study was the intention to engage in open educational collaboration online. This scale was adapted from Venkatesh and Bala (2008) as behavioral intentions have been a validated scale in various acceptance and adoption-related studies regarding technology use and, thus, are applicable for the study at hand. The outcome expectation scale was identified from virtual community research by Chiu et al. (2006), focused on the benefits of one's own standing in the network and an increase in reputation. The affective commitment to collaborators was previously addressed by Bateman et al. (2011). The scale matched our data-driven theoretical definition and thus was used for the study at hand. Further, previous experience in online knowledge sharing was adapted from two separate sources: Davenport and Prusak's (1998) and Lin et al.'s (2009) studies on technology use. We modified the items to fit our study (e.g., "I exchange ideas in virtual communities"; 1 = Never, 5 = Very frequently). The control variable of organizational innovativeness by Bock et al. (2005) was considered suitable and applicable as it deals with the extent an organization allows or inhibits innovative actions beyond organizational boundaries.

Additionally, new scales needed to be developed. The perceived emotional ownership of knowledge had not been operationalized regarding the extent a person feels ownership of certain knowledge he or she possesses. Therefore, the studies by Van Dyne and Pierce (2004) or Jarvenpaa and Staples (2001) could not be applied as we were not targeting the extent to which a person perceives knowledge belongs to the organization. However, based on these studies, we developed several items that measure the extent to which a person feels an emotional attachment and bond to the knowledge he or she possesses (e.g., "I get emotionally attached [e.g., feeling proud, sense of ownership] to the resources I create"; 1= Strongly disagree, 5= Strongly agree).

Based on the qualitative data, we also operationalized personal preferences for working collaboratively on OER development. We could not locate suitable scales although collaborative work-related preferences have been discussed in the OER literature and the creativity of individuals has been discussed regarding idea sharing. We wanted to retain the preference perspective within our items as we observed strong differences between educators' practices and opinions in the

qualitative part of the study. Therefore, we formulated three items for preference for exchanging ideas online such as “I enjoy brainstorming online with my peers on how to turn raw ideas into real solutions” (1= Strongly disagree, 5= Strongly agree). For the preference for working collaboratively on OER development, we prepared items such as “I enjoy building OER in a collaborative manner” (1 = Strongly disagree, 5 = Strongly agree). Further questions were positioned regarding the extent to which the employer organization has set up OER support structures and encourages the use of OER. This could help us understand additional factors that influence educators’ knowledge-sharing behavior.

When we were close to submitting the survey to our participants, we further exposed it to 12 academics for further refinement and content validation. The aim was to improve the understandability of the items and to test whether the new scales could be applied in the survey. Virtual community-related interaction in an open manner was modified to a “open professional virtual community” to reach a common vocabulary, and explanations were included in the guidelines for the survey respondents. Only minor additional changes were implemented, confirming that the data collection could start.

5. Results

5.1 Data analysis: Measurement model

Before constructing and analyzing the measurement and structural models in AMOS software, we conducted an exploratory factor analysis in SPSS to test the new scales. We expected the KMO measure of sampling adequacy to be over the 0.60 threshold and a significant Bartlett’s test of sphericity. Following Chin’s (1998) item-loading threshold (0.7), most of the items loaded well to the respective constructs. One item each from the OE and ORG constructs was dropped because of low loading. The new scales all had sufficient loadings for each item. The measurement model included nine latent factors (including two organization-specific control variables). The model adequacy indicators (Table 2) were all within acceptable levels, fitting the suggested thresholds (Hu and Bentler, 1999): CFI > 0.95, SRMR < 0.8 RMSEA close to 0.60. The validity and the reliability assessment are presented in Annex 2. The composite reliability scores ranged between 0.775 and 0.944, exceeding the suggested 0.71 threshold (Chin, 1998; Comrey and Lee, 1992). The average variance extracted (AVE) by a measure also was satisfactory,

exceeding the score of 0.5 (Fornell and Larcker, 1981); therefore, convergent and discriminant validity was verified. Annex 2 further describes how we tested for common method bias (CMB) before we tested the structural model.

Table 2 Fit statistics

Model	SRMR	CFI	RMSEA	Chi-Square
Measurement model	.0502	0.963	0.60	255 with 188 df
Structural model	.0761	0.958	0.63	272 with 195 df

5.2 Results: Structural model

The structural model and the standardized path coefficients, significance levels and R-squared values are shown in Figure 2. As further illustrated in Table 3, H1, H3, H5, H7, H8 and H9 were supported. H6 was not supported regarding the positive influence of PEI-INTOE. H4 ACC-INTOE was not significant. H2 was not supported while we identified a negative influence of emotional ownership of knowledge on intention to engage in online collaboration. Controlling for organizational innovativeness and awareness of OER did not indicate significant paths.

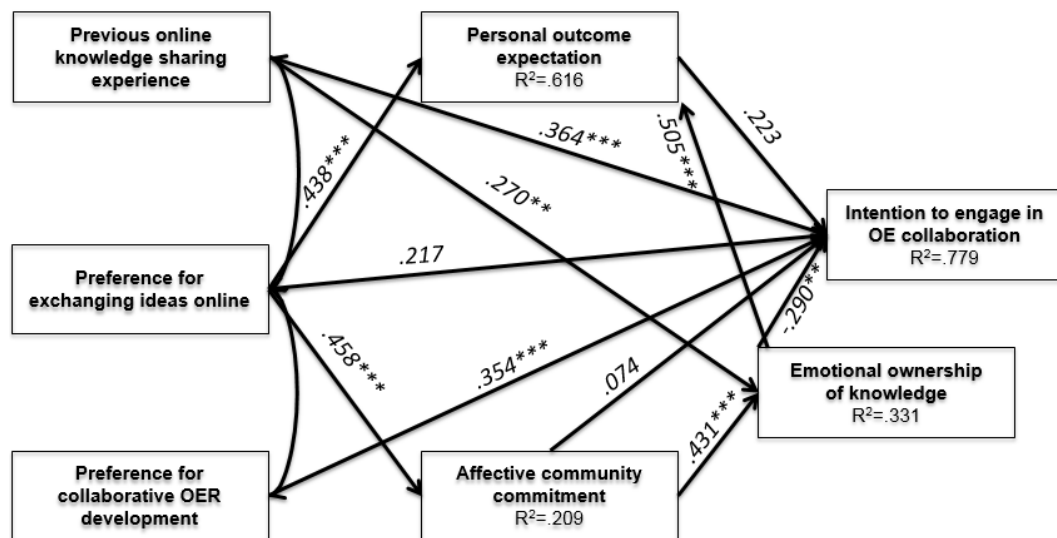


Figure 2 Structural model

Table 3 Summary of results

Hypothesis	Path coefficients	
H1: OE - INTOE	0.223	Not supported

H2: OWN - INTOE	-0.290**	Not supported – Negative effect
H3: OWN - OE	0.505***	Supported
H4: ACC - INTOE	0.074	Not supported
H5: ACC - OWN	0.431***	Supported
H6: PEI / ENJ / EXP - INTOE	EXP-INTOE 0.364***, PEI-INTOE 0.217, ENJ-INTOE 0.354***	Partly Supported. PEI-INTOE not significant
H7: EXP - OWN	0.270***	Supported
H8: PEI - OE	0.438***	Supported
H9: PEI - ACC	0.458***	Supported

***p<0.01, **p<0.05

6. Discussion

The goal of this study was to investigate and explain educators' intention to participate in collaborative idea development for OER and OEP in an open and transparent manner. The study was based on insights gained through qualitative data that were gathered in a series of focus groups and subsequent interviews. The research model showed promising factors that influence educators' collaborative OER development behaviors. The model reflected how emotional and affective issues regarding knowledge and people influence the intention to share knowledge. Additionally, the foreseen benefits and various preferences for collaboration and an individual's previous knowledge-sharing experience contribute to understanding online collaboration behaviors.

The results of the confirmatory and quantitative part of the study indicated that engaging in educational idea sharing online is strongly predicted by one's previous knowledge-sharing experiences and preference for collaborative development of OER. The results raise a dilemma about the emotional ownership of ideas. Although the qualitative study indicated that perceiving the educational ideas, no matter if they originate from oneself, as one's own is a necessary condition to enable collaborative action, structural equation modelling (SEM) analysis gives indications that emotional ownership can be a barrier to collaboration. The stronger one's attachment to the ideas, the less unlikely one would engage in sharing or building new resources and related practices in a collaborative manner based on it. Thus, the educator becomes more hesitant to share that idea with others.

The surprising result was that neither the increase in reputation and position in the network nor affective community commitment increased the intention to engage in

collaborative development of OER online. Perceived ownership was seen to predict the expectation of an increase in reputation and position in the network. Considering that group commitment and experience increase the perception of ownership, we can infer from the results that the increasing attachment to the ideas and perceiving strong ownership can be a motivating factor to pursue the idea further but not necessarily to open up that idea to others' contributions. The expected benefits regarding own status in the network increase with stronger ownership but not necessarily lead to knowledge exchange with open educational communities online. To further analyze educators' knowledge sharing behaviors, we constructed a generalized linear model (GLM) to explore whether gender and age of the participant influence ownership perceptions and intentions to engage in the online activity (Annex 3). These results revealed how neither perception of ownership or intention to engage in open educational collaboration depend on gender or age of the respondent.

The findings can be seen as encouraging and disappointing for the open education movement. Although transparency and openness of education are the key goals of the movement, facilitating idea sharing and collaborations for new OER is extremely demanding in the interpersonal knowledge-sharing settings that this study investigated. As previous research showed that perceived ownership of knowledge is vital for contributing online (Karahanna et al., 2015; Raban and Rafaeli, 2007), despite the motivational factor, educators are unlikely to engage in truly open idea sharing with their peers around the world.

6.1 Finding additional explanations through supplementary data sources

The unsupported hypotheses and some contradictory findings led us to study the phenomenon further. As described in the Method section, we contacted users of a particular online platform designed for collaborative development of ideas for OER and invited them for interviews. These supplementary data, based on interview data from six platform users, was aimed at understanding favorable conditions and enabling factors of collaborative action.

The following describes some descriptive information of the platform usage (January 2015 – January 2016) that served as the context for the supplementary data gathering.

Table 4 Idea-sharing platform descriptives (2015-2016)

Users registered	Joined or created a workspace	non-active
466	335	131
Workspaces created	Active workspaces	Non-active workspaces
118	88	30
1-3 members in workspace	4-6 members in workspace	7-25 members in workspace
53	25	10
1-10 contributions¹ in workspace	11-41 contributions in workspace	42-103 contributions in workspace
30	40	18

Enabling participation

Further interviews on the enabling factors helped us understand how knowledge sharing that is facilitated through multiple steps based on ideas exchanged is about the opportunity to contribute and receive contributions. A user of the idea-sharing platform stated: “I strongly recommend early sharing because I believe that collaboration usually reaches better results.” Furthermore, another respondent believed that it is a lot easier to adapt ideas at an early stage: “The possibility of sharing the idea early on helps to redefine and more effectively develop it as it is easier to be perfected. It is quite constructive.”

Although we did not exclusively study personality traits or account for the underlying motives (e.g., hedonic vs. utilitarian) that potentially influence behavior related to open educational activities, it is safe to state that there are differences in the behavioral intention to share educational ideas between educators who actively use OER in their work and those who are accepting of OER but not necessarily applying or creating them.

Further analysis revealed that preferences for collaborating with previously unknown peers varied significantly between educators. On one end were those who did not see unfamiliarity as a hindrance: “I really don’t care if a collaborator is an acquaintance or if I’ve never met them. However, if others share their ideas freely, I tend to share more of my ideas as well.” Although the activity and example of peers can lead to adaptation of own behaviors, not all wish to expose their ideas to unknown peers, even if they know a person based his or her profile and reputation in the field.

¹ One contribution was counted either as opening and editing Etherpads (each workspace could have many collaboratively editable documents), creating new tasks or items or updating existing items. Commenting on posts was not counted due to the notification overload for the user.

Participating in collaborative development of OER can also be challenging when educators perceive high competition between individuals, groups and universities. Although this was the case for many of our respondents, not everyone considered collaborative actions for OER development as a threat. Some acknowledged that organizational practices can also influence how open education is viewed by employees, especially if the climate, strategies and policies are in favor of open education. Some of our respondents worked in such institutions and were used to sharing with unfamiliar people from other universities as it was a common practice for them.

6.2 Emotional ownership: Enabler or barrier?

The contradictory findings regarding perceived emotional ownership required additional explanations regarding situations when emotional ownership is likely to have a negative effect on contribution behavior.

Additional interviews enabled us to conclude how emotional ownership is especially an enabler when working in a trusted environment with peers. Many of the respondents did not see the online environment that is truly open for participation qualifies as such. The respondents of our study consistently pointed out that any uncertainty about the online collaborative effort is likely to influence a decision not to participate in educational idea sharing. The perceived risk of idea appropriation, and of ultimately not receiving credit for their work, appeared high in this context. In a familiar environment (e.g., with close colleagues), a strong emotional bond with the resources is necessary to keep the interaction vibrant.

We especially wanted to understand whether the barrier perspective can be simply explained by the open vs. closed debate. Analysis of the primary and supplementary data showed how the issue is more complicated. It is not always the case that in an open environment educators become protective of the knowledge they possess. It can also be just hard to play by the rules of a collaborative action without sacrificing one's own "novel view" how to proceed. The collaborative action requires adaptation to the process and adoption of the contributions of others, and this can cause time-loss or strain: "Sharing an idea and creating a course together means that we had to be open and confident. Sometimes, accepting others' opinion is a big task, because you might think that your idea and your opinion are more important." Adapting to others' opinions and ways of working is also the case when contributing to an existing collaboration about OER development. In this case,

educators might feel that they need to let go of some parts of their ideas, thus jeopardizing the applicability of the new resources to the context (e.g., curriculum, didactical approaches preferred): “When you join a collaboration on what other universities have worked on, you follow their path. But it is in our hand to decide to join or not.”

Collaborative work on new educational resources in an online environment can also create ambiguity, which, together with time constraints, can explain why certain knowledge is not shared: “When there is a lack of time, I’m not sure if they understand what my idea or contribution is about.” Others’ contributions might also change the course or direction too drastically: “When you create your own idea, you are free to decide which direction you take it.”

The previous insights of our study are partly in line with previous research on ownership and territoriality. Once individuals perceive knowledge as “theirs,” they might create behaviors to protect and defend those assets (von der Trenck, 2015). In addition, organizational contexts are not necessarily comparable when it comes to utilizing types of knowledge in daily work activities. However, the types of competitive and even territorial behavior reported by von der Treck (2015) and Brown et al. (2005) are likely to occur in universities when it comes to the competence of educators and their didactical approaches.

6.3 Emotional ownership during moments of engagement

As our study led to the result that emotional ownership can under certain circumstances become either an enabler or a barrier to knowledge sharing, we elaborate further on the factors that lead to sharing or non-use behaviors. Figure 3 presents a synthesis of our study in the context of engaging in a virtual community to build OER and related practices in a collaborative manner. The model is positioned at the moment of exposure when the educator reveals the opportunity to engage in the collaborative effort—similar to our study setting.

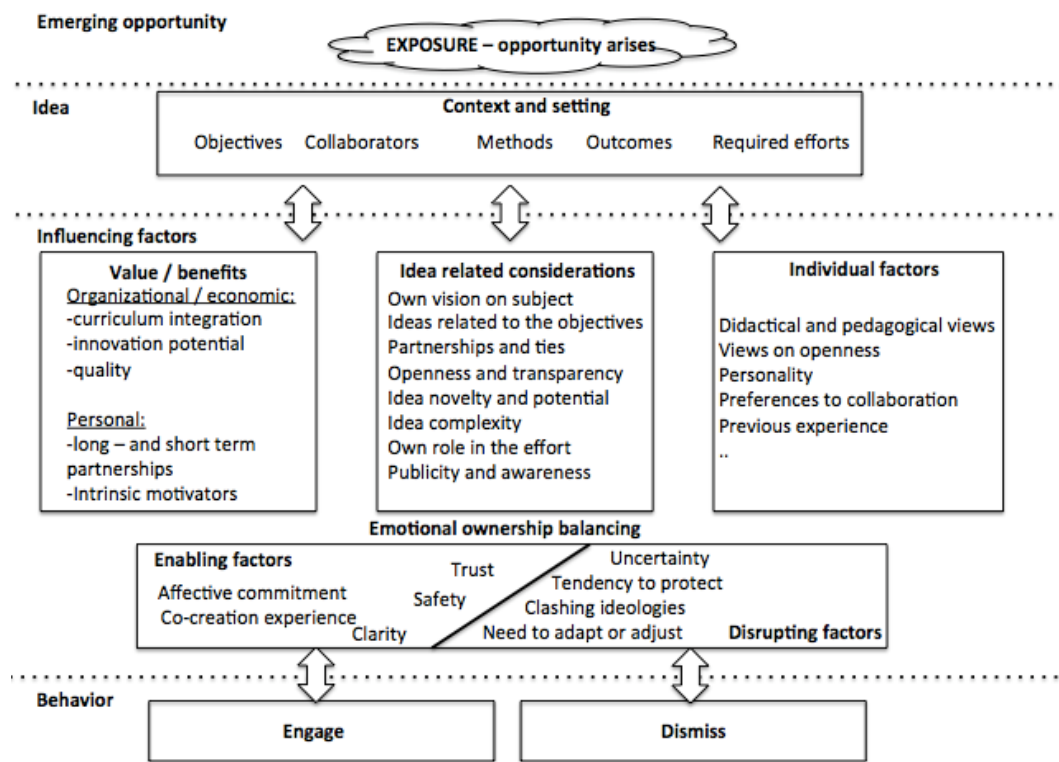


Figure 3 Model explaining exposure to collaborative OER development

The model indicates critical issues for the intention to share knowledge and related decisions to contribute or dismiss the opportunity at hand. The context and setting that is revealed during exposure set the conditions against which the educator rationally or intuitively weighs the options whether to engage or not. The context can be fully online, offline or a combination of these. As explained, the critical issue in engagement is the expected level of openness and transparency, reaching even previously unknown collaborators with similar interests. For contribution behaviors, trust, comfort and familiarity with the practice are strong predictors. Some of the educators who participated in the research clearly are willing or had already taken their collaboration toward openness and transparency. We also found several cases where moving toward openness is a logical next step once the ideas towards new resources have reached some level of maturity. The contributions from others are more about fine-tuning and, thus, not jeopardizing the applicability of the resources to own setting or influencing the selected approach to a large extent. In such cases, it was very important that an individual feel that he or she could stand behind the proposed version of a certain “sketchy” educational material and consider it presentable. Our analysis, however, does not indicate that moving from

closed to open is actually a process or sequence of events although some cases might imply that.

We want to stress that engagement-related behavior is not constant or linear. The intrinsic and extrinsic factors that might motivate the educator during exposure and the following phases of knowledge exchange might change over time as might the contribution behavior. Our findings show how a contributing educator is not necessarily the initiator of the process. Our data imply that shared representations of ownership are truly possible, but more research is needed to validate the significance of such perceptions.

6.4 Contributions to theory

Our study makes several contributions to theory. First, the study is one of the first to consider the factors that influence educators' online collaborative behaviors. This study is also one of the first to show evidence of those behaviors through empirical research. From the perspective of online collaboration, the higher education setting has been mainly looked at from the perspective of learning and of students. Examples of such studies include collaborative writing and utilization of wiki software (Kear et al., 2010; Zheng et al., 2015). Knowledge sharing in the case of OER has mainly focused on sharing of resources (Pirkkalainen and Pawlowski, 2014; Davis et al., 2010), not the collaborative development of resources.

Second, our study enables a starting point for discussing the implications of emotional ownership and territoriality to collaborative practices that are in the core of open education. Our study confirms in this regard how challenging such open and transparent processes are to initiate and sustain, an argument that has been proposed by various OER-related studies (e.g. Farrow et al., 2015; Pirkkalainen and Pawlowski, 2014; Ochoa and Duval, 2009). Through the data-driven approach, we were able to identify factors that reveal deeper insights into the perceptions and preferences of educators, emphasizing their online behaviors. Further, the operationalized constructs of our study provide a strong basis to extend research on attachment and ownership-related topics in education. The data analysis showed how the created constructs provide reliable and valid scales to be taken up in further research.

The dilemma of emotional ownership is a new contribution and one of the vital factors that influences knowledge sharing in online environments that support the openness and transparency of discourse. The rich data gathered with the principles

of theoretical sampling allowed us to uncover certain conditions and influencing factors for perceived emotional ownership and its role either as an enabler or a barrier, thus advancing the work already started by researchers and groups such as Van Dyne and Pierce (2004), Raban and Rafaeli (2007), Caspi and Blau (2011) and many others. We have to emphasize that previous studies have been correct by specifying the lack of reuse of OER as a critical problem. However, we are confident that through the analysis of the dilemma of emotional ownership, we have been able to specify factors that explain behavior that is favorable and unfavorable to knowledge exchange.

6.5 Contributions to practice

The results of this study also inform the open educational domain and further development of educational software to facilitate educators' online collaboration. The discussion in the educational domain needs to recognize certain caveats of educational collaborations online, to recognize the dilemma of emotional ownership, and to proceed with discussions on appropriate interventions. As practical implication of our study, educational communities can facilitate online collaborations more effectively by matching participants not only based on their needs (e.g. shared interest) but also emphasizing comfort (e.g. trusted environment with known peers) and chance to gradually increase openness by inclusion of further participants to the community. Our model clearly shows how neither the benefits of openness or collaborative efforts between educators are reaped if too much openness and transparency are set in the start of collaboration. Thus, educational communities in online environments need to consider how educators' collaborations can be facilitated with levels of openness that are richer than simplifications such as "open vs. closed."

We highly encourage developers of related educational software to allow closed collaborations to be formed that are based on strong and existing ties. The decisions by a spokesperson for openness and a lead user of a certain community cannot and should not suppress the opinion of a silent collaborator who does not act as openly. It is not enough to consider privacy and access options to limit the collaboration to a specified audience. Individuals should be able to announce their preferences to a system that can adapt to such requirements without the fear of losing face within the community among those who might have differing requirements. Design-based

research is needed to develop the open educational understanding emphasized by Anderson and Shattuck (2012).

Finally, we believe our model is helpful to other domains of openness such as collaborative tasks online in general. When online communities seek collaboration beyond existing strong networks, emotional ownership will likely influence whether participation is successful or not.

7. Conclusions

Transparency and openness in education are increasingly discussed at all educational levels. Many of the practices facilitated by technology via specific sites and software have struggled to reach the expected levels of adoption, regardless of the importance and relevance to the field. This study aimed to understand educators' online behaviors in terms of collaborative development of OER and related practices. The data-driven approach resulted in several factors that influence educators' intentions that were consequently validated and discussed in this study. This study had several limitations. As pointed out in the discussion, we did not investigate related factors that might explain idea-sharing behavior for OER, such as personality traits or the extent of shared values, beliefs or joint perceptions of possession. We also did not separate the types of collaborative actions based on the complexity and novelty of the project but chose to study participation in collaborative OER development in general.

As a conclusion, the results of this study confirmed on many levels the assumptions and underlying perspectives regarding challenges of reusing OER and engaging in online collaboration in a transparent manner. The new insights acquired through emotional, attachment and preference-related perspectives showed the dual nature of emotional ownership of knowledge. The implications for open educational communities are evident, and we urge researchers and practitioners to consider interventions to bridge the openness problem by providing security, control, comfort and trust for collaborative practices between educators online. Thus, not only design and behavioral implications but also policies and strategies in educational institutions could help overcome the dilemma of emotional ownership. Finally, we encourage researchers to extend our model and to investigate emotional ownership in differing educational scenarios. We believe it is crucial to address favorable conditions for collaborative working in the early phases of technology

maturity; For example, in relation to new and emerging educational technologies such as augmented and virtual reality environments.

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ANNEXES

Annex 1 – Model building –related descriptive information

Table 5 Focus group arrangement

Focus group	Details
1. Finland	<p>Mode: Online with international participants Tool: Adobe Connect Date 24.2.2014 Duration: 2 hours Participants: 25 18 researchers 3 freelancers 5 from Edutech- companies 12 female, 13 male Nationality: Finland 9, Germany 4, Greece 3, China 2 Sweden 1, Norway 1, Iceland 1, Lithuania 1, Macedonia 1, UK 1, India 1</p> <p>Language: English</p>
2. Germany	<p>Mode: F2F at university campus, Berlin Held: 25.2.2014 Duration: 2 hours Participants: 5 3 researchers, 2 from Edutech- companies 2 female, 3 male Nationality Germany 5</p> <p>Language: English</p>
3. Lithuania	<p>Mode: F2F at University campus, Kaunas Date: 21.2.2014 Duration: 2 hours Participants: 10 researchers 5 female, 5 male Nationality Lithuania 10</p> <p>Language: Lithuanian (transcription translated in English)</p>
4. Germany no 2	<p>Mode: F2F at university campus, Heillbronn Date: 7.3.2014 Duration: 4 hours Participants: 9 3 Edutech- professionals 6 researchers 2 female, 7 male Nationality Germany 9</p> <p>Language: German (transcription translated in English)</p>
5. Belgium	<p>Mode: Online with international participants Tool: Adobe Connect Date: 12.3.2014 Duration: 1 hour 45 minutes Participants: 8 4 from Edutech- companies 4 researchers Nationality USA 1, Germany 3, Slovenia 1, Belgium 1, South Africa 1, South Korea 1</p> <p>Language: English</p>

6. Greece	<p>Mode: F2F at university campus, Athens Date: 6.3.2014 Duration: 3 hours Participants: 7 3 from Edutech- industry 4 researchers 3 female, 4 male Nationality Greece 7 Language: Greek (transcription translated in English)</p>
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Table 6 Semi-structured interviews

Method	Respondents	No	Timeframe	Aim
Interviews	3 edu-project managers, 3 professors, 2 E-learning specialist, 3 researchers	11 interviews conducted -Duration 30 – 60 mins. -Transcribed to English -Content analysis, mapping to existing themes	April – June 2014	Additional insights and further explanations on the identified themes. Data to support the conceptualization of new constructs
Respondent	Further information			
1	Mode: F2F interview, Place: Heilbronn, Germany, Role: Professor, Gender: male, Nationality: German, Language: German (transcription translated to English)			
2	Mode: F2F interview, Place: Heilbronn, Germany, Role: Project manager, Gender: female, Nationality: German, Language: German (transcription translated to English)			
3	Mode: Online via Adobe Connect, Role: E-learning specialist, Gender: male, Nationality: Macedonian, Language: English			
4	Mode: Online via Adobe Connect, Role: E-learning specialist, Gender: female, Nationality: Icelandic, Language: English			
5	Mode: F2F interview, Place: Berlin, Germany, Role: Professor, Gender: male, Nationality: German, Language: English			
6	Mode: F2F interview, Place: Berlin, Germany, Role: Researcher, Gender: male, Nationality: German, Language: English			
7	Mode: F2F interview, Place: Athens, Greece Role: Professor, Gender: male, Nationality: Greek, Language: Greek (transcription translated to English)			
8	Mode: F2F interview, Place: Kaunas, Lithuania, Role: Researcher, Gender: female, Nationality: Lithuanian, Language: Lithuanian (transcription translated to English)			
9	Mode: F2F interview, Place: Kaunas, Lithuania, Role: Project manager, Gender: female, Nationality: Lithuanian, Language: Lithuanian (transcription translated to English)			
10	Mode: Online via Skype, Role: Project manager, Gender: male, Nationality: German, Language: English			
11	Mode: Online via Skype, Role: Researcher, Gender: male, Nationality: British, Language: English			

Annex 2 – Confirmatory part- related information

Table 7 Item descriptions

Construct	Item	Item description
Intention to engage in open educational collaboration	INTOE_1	I plan to engage in open professional virtual communities to share my educational ideas with peers
	INTOE_2	I plan to engage in open professional virtual communities to collaboratively build OER
	INTOE_3	I plan to engage in open professional virtual communities to create new open educational practices
Outcome Expectations (Networking and reputation)	OE_1	Sharing my knowledge can build up my reputation in the open professional virtual community
	OE_2	Sharing my knowledge in an open professional virtual community will give me a sense of accomplishment
	OE_4	Sharing my knowledge will strengthen the tie between other members in the open professional virtual community and me
Emotional ownership of knowledge	OWN_1	Feeling a strong ownership of the ideas and resources being created in the virtual community is important for me
	OWN_2	I expect to be emotionally attached to the ideas I am sharing in open professional virtual environments
	OWN_3	I get emotionally attached (e.g feeling proud, sense of ownership) to the resources I am creating (writings, products, services)
Affective community commitment	ACC_1	Feeling a strong connection to other members of the virtual community is important for me
	ACC_2	Feeling a strong sense of belonging is important for me in virtual communities
	ACC_3	Feeling like a “part of the group” is important for me in virtual communities
Preference on collaborative OER development	ENJ_1	I enjoy building OERs in a collaborative manner
	ENJ_2	I enjoy building OER in a collaborative manner with my peers in professional virtual communities
	ENJ_2	I enjoy turning ideas into OERs with online community of peers
Preference on exchanging ideas online	PEI_1	I enjoy brainstorming online with my peers on how to turn raw ideas into real solutions
	PEI_2	I enjoy engaging in collaborative settings online when ideas are still raw
	PEI_3	I enjoy online collaboration on ideas that haven't matured
Organizational innovativeness	ORG_1	My organization encourages employees to actively promote the organization on the internet
	ORG_2	My organization encourages employees to develop their competences as they see best
	ORG_3	My organization encourages employees to engage in cross-organizational business opportunities
	ORG_4	My organization encourages employees to start new collaborations with external stakeholders and organizations
Organizational awareness and support on OER	ORGOER_1	My organization encourages employees to use OER
	ORGOER_2	My colleagues generally accept OER
	ORGOER_3	My institution has established common practices for working with OER
	EXP_1	I engage with virtual communities to learn how to do things
	EXP_2	I exchange ideas in virtual communities

Previous online knowledge sharing experience	EXP_3	I share and discuss my experiences with others in virtual communities
	EXP_4	I share my thoughts with my peers in virtual communities

Table 8 Descriptive statistics of the constructs

Construct	Items	Cronbach's Alpha	Mean	SD
Intention to engage in open educational collaboration –INTOE	3	.912	3.57	.877
Previous online knowledge sharing experience – EXP	4	.944	3.29	1.08
Emotional ownership – OWN	3	.805	3.75	.712
Affective community commitment – ACC	3	.901	3.59	.863
Organizational innovativeness – ORG	4	.848	3.79	.776
Organizational awareness and support on OER – ORGOER	3	.773	3.33	.841
Outcome expectations (networking and reputation) – OE	3	.828	3.92	.683
Preference on collaborative OER development – ENJ	3	.916	3.48	.818
Preference on exchanging ideas online – PEI	3	.910	3.55	.871

Table 9 Correlations among constructs

	CR	AV	ORG	INTO	OE	OW	AC	ENJ	PEI	EXP	OR
		E	R	E		N	C				G
ORG	0,77	0,53	0,734								
R	5	8									
INTOE	0,91	0,77	0,269	0,881							
	3	7									
OE	0,83	0,62	0,308	0,625	0,78						
	0	0			8						
OWN	0,81	0,60	-0,034	0,246	0,63	0,777					
	8	4			7						
ACC	0,90	0,75	0,128	0,434	0,49	0,551	0,86				
	1	3			5		8				
ENJ	0,91	0,78	0,194	0,749	0,60	0,403	0,43	0,88			
	7	7			1		2	7			
PEI	0,91	0,77	0,097	0,745	0,57	0,264	0,43	0,62	0,88		
	1	4			2		4	4	0		

EXP	0,94	0,81	0,129	0,755	0,63	0,443	0,47	0,62	0,66	0,90	
	4	1			6		0	3	1	1	
ORG	0,85	0,58	0,638	0,191	0,37	0,151	0,13	0,16	0,23	0,19	0,76
	1	9			3		9	3	1	6	7

Diagonal axis represents square roots of average variance extracted (AVE). CR=Composite Reliability, AVE= Average variance extracted

Table 10 Common method bias test with method factor

model	Chi-square	CFI	RMSEA	Comment
All items load on respective factors	255 with 188 degrees of freedom	0.963	0.60	Significant bias if the model with the method factor is significantly better. Results indicate lack of method bias.
All items load additionally on a method factor	201 with 166 degrees of freedom	0.981	0.46	

Annex 3 – Age and gender analysis (GLM)

To explore age and gender differences regarding perception of ownership and intention to engage in open educational collaboration online, we constructed a generalized linear model (GLM). The fixed factor of the model was the gender of the respondent. Age was used as a covariate. We included a fully factorial intercept in the model.

The analysis showed how perceived ownership (table 11) or intention to engage in open educational collaboration (table 12) do not depend on the age or gender of respondent. None of these main effects were statistically significant. For perceived ownership the upper and lower bounds of 95% confidence interval were 3.42 and 4.65, $p < .01$ and for intention to engage in open educational collaboration the upper and lower bounds of 95% confidence interval were 1.96 and 3.44, $p < .01$.

Table 11 General linear model predicting emotional ownership

Source	df	F	Sig.
Corrected Model	2	.464	.630
Intercept	1	191.156	<0.01
Gender	1	.227	.635
Age	1	.823	.366

Note. N=100. R Squared = .09, adjusted .11)

Table 12 General linear model predicting intention to engage in open educational collaboration

Source	df	F	Sig.
Corrected Model	2	.344	.633

Intercept	1	61.110	<0.01
Gender	1	.001	.675
Age	1	6.708	.11

Note. $N=100$. R Squared = .07, adjusted (.05)