Developing an Open Educational Resource and Exploring OER-Enabled Pedagogy in Higher Education

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Abstract

There is a growing trend in higher education to explore the various benefits of Open Educational Resources. This applies not only to the cost benefits, but also to potential pedagogical benefits as well. This study explores the process of developing and implementing an Open Educational Resource for an undergraduate course and experimenting with OER-enabled pedagogy. Interview data provide an account of this process, outlining challenges and highlighting insights, which might prove useful for other professionals contemplating the move toward developing Open Educational Resources. Interview data are also organized using the Unified Theory of Acceptance and Use of Technology constructs pertaining to attitude, performance expectancy, effort expectancy, social influence, technology self-efficacy, and facilitating conditions. A qualitative interpretive approach was then used to analyze the data. Analysis indicates that most of the constructs can strongly influence faculty to adopt Open Educational Resources but that "social influence" has no effect on adoption. Findings also include reflections on OER-enabled pedagogy as it was applied in the course. These findings indicate that OER-enabled pedagogy has the potential for increasing student engagement, though this potential has not yet been realized. Finally, findings provide an outline of recommendations that might guide others when considering developing and implementing Open Educational Resources.

Keywords: Open Educational Resources, OER-enabled pedagogy, UTAUT; OER, OER use, development

Over the centuries, the concept of formal education has been intricately coupled with the idea that books are an indispensable component of that experience (Reed, 2018). Indeed, some of the first institutions of learning were formed around large collections of materials such as found at the Library of Alexandria (Cubberley, 1902). Modern education has continued to demonstrate this reliance on books, with an ongoing dependence on commercial textbooks as an integral part of the curriculum (Weller, 2014). Unfortunately, this practice has been shown to have an impact on the student experience in the current higher education context. This is due to the high cost of textbooks, which can potentially prove to be an access barrier to essential educational resources (Brandle et al., 2019). In fact, as of 2017, the U.S. Bureau of Labor Statistics reported that the cost of textbooks rose by 142% over the last decade and a half, which represents a rate that is four times that of inflation (U.S. Bureau of Labor Statistics, 2017). As a result of these high costs, students may choose not to purchase textbooks. In a study published in 2018 by Wakefield Research, 42% of students surveyed said they had avoided purchasing course materials because of costs (Lederman, 2018).

Considering this backdrop, it is no wonder that there has been an uptake in interest in the adoption and development of Open Educational Resources (OER). OER are learning resources that are made available either at no cost in digital format or for very low cost in print format. They either reside in the public domain or carry with them the necessary Creative Commons licenses to allow for flexible reuse, revision, remixing, retention, and redistribution (the 5 Rs) increasing their flexibility (Wiley et al., 2014). It becomes apparent that OER, providing both free and flexible access, would be a logical alternative in addressing the textbook cost issue. In addition to the cost-saving aspect of OER, others are exploring the potential to promote open practices and to investigate pedagogical shifts through the use of these resources (DeRosa & Robinson, 2017; Ehlers, 2011; Wiley & Hilton III, 2018).

This research examines the experiences and perceptions of faculty and staff as they develop an OER for an undergraduate nutrition course and apply it in instruction. It further examines the experience of one instructor undertaking teaching with OER-enabled pedagogy (OP), which is a pedagogical approach involving students in the co-creation of content (Wiley & Hilton III, 2018). Findings are organized by recording the experiences of faculty and staff as they develop and implement an OER and then by examining perceptions through the lens of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Recommendations from this experience are also presented, which might prove useful for exploring the development of OER. This knowledge could, in turn, be used to promote greater use and development of OER, and, therefore, to support greater student access to and application of learning resources. This access might subsequently impact student success in higher education.

Literature Review

A large amount of research exists that explores factors that might motivate faculty to adopt OER and factors that might present challenges (Algers & Silva-Fletcher, 2015; Anderson et al., 2017). The literature shows that faculty are motivated to adopt OER in order to cut costs for students and to enhance educational equity (Belikov & Bodily, 2016) as well as to pursue pedagogical freedom (Dermody, 2019).

A more recent movement in the consideration of OER adoption is how these resources play a role in the further development of open educational practices (OEP) and how these practices can potentially enhance student learning (Cronin, 2017; see Figure 1).

Figure 1: OER can play a role in promoting various aspects of OEP.

One of the first discussions of OEP was put forth by Ehlers (2011), who described a second phase of OER development whereby there is a shift from a focus on OER as merely resources to a focus on how they can promote open practices in education. In a paper discussing how open resources support the exploration of open pedagogy, DeRosa and Robinson (2017) reported that when students are exposed to and engaged in the use and reuse of learning resources, they can begin to develop new and deeper relationships with the resources, which might impact learning. Since the term "open pedagogy" has become associated with OER in recent years, and in order to avoid confusion, this research used the term "OER-enabled pedagogy" as defined by Wiley and Hilton (2018) as "the set of teaching and learning practices that are only possible or practical in the context of the 5R permissions that are characteristic of OER" (p. 133).

The scholarly literature does not provide in-depth research on faculty who have already adopted OER and who may be experimenting with OP. In addition, it does not provide a great deal of research detailing the process of OER creation and application within a course (Mallinson & Krull, 2015). An account of this process might prove useful for other professionals contemplating the move toward OER creation by providing insights into the actual process as well as useful guideposts along the way. Therefore, the focus of this research was to explore the experiences and perceptions of faculty and staff in higher education as they initiated and developed an OER for an undergraduate course and then applied it in instruction.

Methodology

This study applied an interpretive qualitative approach (Creswell et al., 2006) in order to explore the perspectives of faculty and staff engaged with the development and application of an OER textbook and OP in the context of higher education. This approach uses word-based data in its analysis and views human action as meaningful and best studied in its social contexts (Yanow & Schwartz-Shea, 2006). Eight participants took part in this research. They represented the various roles involved with the development and application of an OER for one specific undergraduate class at a research-intensive university. An exempt status IRB approval was secured for the study as well as consent for all interviews. Data were recorded, transcribed, validated by participants, and anonymized.

Participants
Eight individuals made up the participating team. Two faculty members had been involved in securing a university OER Initiative Grant (http://oer.hawaii.edu/projects/) in 2017 and in organizing and guiding the overall development of a textbook for their academic area. Graduate assistants (GAs), acting as resource developers, worked on adapting or creating detailed information within the text under the guidance of the faculty. An institutional OER technologist provided instructional design and resource development support as well. Instructors implemented the OER textbook and provided feedback to enhance later modifications. One of three course instructors experimented with implementing OP activities within two sections of the course. Interviews with these participants represented all but one member of the entire team and represented all of the participant roles.

The UTAUT Model
Constructs associated with the UTAUT framework guided this research (Venkatesh et al., 2003). The UTAUT model is based on eight different technology acceptance models and is applied in research to explain user intentions to use an information system and subsequent usage behavior (Venkatesh et al., 2003). This framework is based on core constructs that determine the intention to adopt a specific technology: performance expectancy, effort expectancy, social influence, and facilitating conditions. The original UTAUT framework also included the constructs of attitude and Internet self-efficacy, which were incorporated into the framework for this research.

The UTAUT model has helped to guide research exploring different aspects of technology acceptance in the context of open access adoption studies and open practices (Dulle & Minishi-Majanja, 2011; Kandiero, 2015; Mtebe & Raisamo, 2014; Percy & Van Belle, 2012). These authors have indicated that the original UTAUT framework used in quantitative research has proved consistent as a model, with high validity and reliability, and is robust in predicting the acceptance of a new technology as compared to other models (Percy & Van Belle, 2012). Though this model has primarily been applied to research investigating potential acceptance and use of a technology, it is also appropriate to apply as a guiding framework when exploring the process of development and adoption of a technology because it examines influencing factors.

Research Question
The research question explored in this study was as follows:

> What are the perceptions and experiences of faculty and staff in the development of an OER, in instruction introducing the OER, and in the application of OER-enabled pedagogy in an undergraduate course?

Instrumentation
The instrument developed for this study consisted of semi-structured interview questions with a guiding interview protocol. Questions, which were based on the constructs that outline the UTAUT model, varied as appropriate to the participant role. Questions addressed the roles of faculty, OER technologist, resource developer, and instructor.

The interview questions referenced those developed by a number of researchers applying the UTAUT model (Dulle and Minsihi-Majana, 2011; Venkatesh et al., 2003). They also referenced those developed to examine instructional priorities for adopting OER (Jung &

Hong, 2016). The referenced instruments were either released under a Creative Commons license, which allows reuse, or permission was sought for their use.

Data Collection and Analysis
Qualitative data were gathered through recorded semi-structured interviews with the eight participants who were involved throughout the project. Data were then transcribed professionally and later validated by the interviewees. Analysis was conducted as passages in the text were identified and coded. Next these codes were categorized and then thematically analyzed. Through this process, the words of the participants were used to deepen understanding and shed light on the process of OER development and use (Corden & Sainsbury, 2006). The narrative developed from the data was later sent to the participants for final review and validation.

Findings

Findings for this study were organized in two ways. Firstly, the experiences of the faculty and staff as they moved from the initial conception of the OER project through the development and application in instruction were recorded in a narrative format. Secondly, findings and the emerging themes were organized by and recorded through the lens of the UTAUT framework. Insights from the findings were also translated into recommendations in order to provide a guide for subsequent OER development.

Development and Application of the OER
Inception. To prepare for the upcoming semester, the lead faculty visited the bookstore to pick up the newest edition of the textbook she had been using. She reported being 'appalled. It was $130 for a book that didn't have any binding, no cover, and it had two different sets of page numbers!' She didn't think she could ask students to work with such an obviously "awful" textbook and immediately emailed the campus OER technologist to find a solution.

The technologist suggested that the faculty apply for a campus OER grant offered through the Outreach College. She applied for and was awarded the grant. At this point, she identified a team that would become responsible for the development of the OER. The team would ultimately consist of the lead faculty, a support faculty, the OER Technologist, two graduate assistants, and three instructors, who would later implement the text.

The goal of the project from the faculty members' perspective was to develop a free resource that could be shared and that was as good as, or better than, the customary commercial textbook. Also, the faculty wanted a resource over which they had control of the content and one that was "placed-based and more appropriate for their student population".

Development. The actual work began in January 2017. After the first GA was hired, weekly meetings became the norm, which continued for the year during the development phase. These meetings became a critical component of the workflow and helped to "ensure a successful product". The GA reported that the first order of business was to "brainstorm everything. Figuring out … what was the mission for this book, what were our goals … then outlining the chapters … before beginning to research". The technologist relied on his background as an instructional designer to provide guidance in the overall design of the resource as the team "made a version that was based on how [the faculty] wished the course would be".

After the initial brainstorming meetings, the faculty members' role became to first "organize the sequence of topic areas" and then "find OER resources that were already out there … judging which ones best fit the level of science that we were teaching and were reliable and seemed to be sound""". The OER technologist assisted the team in this phase by directing them to existing resources.

Throughout the process, someone needed to take the key role in leading the OER development. The lead faculty fulfilled this role by "ultimately being the one responsible to see [the project] from start to finish" and to ensure that funding was available.

The GA reported helping with the "basic outline of the textbook, and then actually finding the content or writing the content if it wasn't available". The GA shared, "The faculty were able to contribute to [the text] to make sure that we had the key points correct … as a lot of nutrition books seem to have wrong information". After the first semester, the Gas changed. The newly hired GA brought fresh eyes to the project finding that "there were a lot of things missing that we really wanted to include". For example, they wanted to make sure that "every chapter there has a connection to something … that relates to Hawaii or Pacific Islanders". This GA was also responsible for finding openly licensed photos and images, which became "a huge, time-consuming factor". As the content started emerging, the GA was also aware of the need to provide a consistent tone and similar structure throughout the material. As the resource more fully formed, the technologist organized an outside review by working with the Rebus Project, which provides a community of collaborators with publishing guidance for OER projects. Through this project, the resource was reviewed by "subject matter experts from a couple of different institutions … and [by] different copy editors … to look for tone and consistency".

Most of the work had been completed in Google Docs for collaboration purposes. The final product would be offered as a Pressbook. The OER technologist indicated that "Once you're in Pressbooks, the process [of developing the OER], the workflow, is not as streamlined, not as smooth". It was in the Pressbook development phase where the team began "doing the real aesthetic things of making sure the references looked fine or fixing tables". The team needed to work with "the resolution of images so they would print well" and "to add in alternative text … for accessibility". The final stage also included sharing the resource beyond the boundaries of the university. The OER technologist "shared it over Twitter, over social media, and emailed it to a couple of different listservs, and sent it to a few folks … who were waiting for the book".

Transition into instruction. In the process of transitioning to a new instructional resource, the instructors reported that there "wasn't much of an impact [on their workload] … just updating links on … a personal website". One instructor reported that the "impact was really positive. It feels so nice as an instructor to say, 'We have this free resource for you'". Another instructor reported, "a bigger impact [was that] I felt good about the way the information was being shared to students and the fact that it was free, that they could have access to this textbook even after the course is over. It is also more relatable, with local information and beautiful local pictures".

OER-enabled pedagogy. When launching the new textbook, one instructor decided to begin work on a unit that she felt was missing from nutrition textbooks. Her goal was to begin developing a unit on "health at every size, body positivity, and size diversity". Realizing that this goal would unfold over several semesters, she began by involving students in research in this field, which would later appear in the textbook. "I was able to create an assignment for the students [on this topic], and on how to use the library database, and how to look up peer reviewed journals under [this] topic that were not in the book yet". She continued by saying,

"The whole premise of the class is that we're teaching evidence-based recommendations and information. To have them try to find research, read it, and connect to a topic we were developing. … To get them a little excited to know this is part of the research [process], and they're contributing, and that it might make a difference".

In terms of the impact of this approach on instruction, the instructor shared that "students are taking part in deciding what is important, and making those decisions, and developing those critical thinking skills about maybe what … their textbooks have, or don't have, or that they wish they did have". The instructor continued by saying, "they have … that student eye, … and we're trying to develop them into these critical thinkers who can look at evidence and determine 'Is this worth putting in a textbook, or not?' … It's creative, and it makes a lot of sense".

UTAUT Constructs with Emerging Themes

The following section reviews the data using the structure of the UTAUT framework in order to explore the perceptions of the OER team as they developed and applied the resource in instruction. It also provides data on the perception of OP as applied in the context of this study.

Attitude. This construct refers to an individual's feelings – both positive and negative – towards the use of a technology (Venkatesh et al., 2003). Three main themes emerged from the data: pride in localizing the information; a sense of well-being that students were being served; and sharing of the resource was part of the overall goal.

One of the faculty stated, "Two thirds of our students come from here. So, we really try to be mindful of that and have the place – our community – reflected in the textbook… with Hawaiian values and examples… You wouldn't get that in a traditional publisher's textbook".

One instructor, who had recently been a student herself, relayed that "the personal satisfaction I get is just knowing that I have students who are probably helping their families to pay rent, or a mortgage, or bills… If I can help to offset that by having this resource available, then you know, they feel more supported in their education. I think it goes back to equity… and how we are not all privileged".

Another faculty member reflected on the idea of sharing the OER, "I would be honored to share the OER … it's part of the big objective that this be used elsewhere, too". The technologist relayed that they "put the most liberal open license on [the OER]. Because we want this content, and this book, to travel as far as possible".

Performance expectancy. This construct focuses on the degree to which an individual perceives that using a system or technology will help in attaining a gain in job performance (Venkatesh et al., 2003). Those interviewed perceived that the application of the OER 1) afforded benefits to assist students in their learning, 2) provided control over content, and 3) allowed professional recognition.

Through the interviews, several benefits to students came to light. Data indicated that the OER benefited students in terms of equity and accessibility when an OER was employed. This was achieved by both removing the cost barrier for the resource and by opening up forms of access. One faculty mentioned that, besides being free, one of the main benefits of an OER was "being able to view it on the web and then also download it in multiple formats". The OER technologist also mentioned that "hundreds of students go through this course every semester.

… and they know that they will always have access to the book". In addition, one faculty shared that it had become evident through her experience that "the place-based aspects of [a resource] help students relate to material, which then typically enhances learning".

Participants felt that the flexibility of having control over the content in order to revise and update the OER was an important strength in using OER. One faculty remarked, "I like the concept of something that we can have in-house control over. It evolves as we use it. We should be able to improve it and pass it on to the next generation". The OER technologist recognized the flexibility using an OER offers: "… it opens up the possibilities of what [faculty] can do with the book when they know they can change. It's like being liberated".

Finally, the team shared a range of professional gains. One faculty didn't know if work on the project would be beneficial to promotion because no institutional recognition is given to scholarship when developing OER. However, another faculty felt that the campus promotion and tenure committee "saw the value" in the work done on the OER because use statistics were available to support instructional efficacy. In addition, the team had received almost 20 requests from different institutions indicating they were interested in adopting the OER, which impacts networking and professional reputation.

Effort expectancy. This construct refers to the degree of ease associated with the use of the technology or system (Venkatesh et al., 2003). It is applied in this research as the ease of developing the OER and applying it to instruction. Themes that emerged related to the challenges in developing the OER, and that there were minimal challenges in instruction.

Numerous challenges came to light during the interviews: time needed for resource development; securing supporting funding; finding and adapting content; and creating graphics. All team members expressed surprise in regard to the amount of time it took to fully develop the OER. As one GA mentioned, "The idea of an OER textbook, a free textbook, sounds great, but when you are actually doing a lot of the work, … you realize how much work it really is!" In addition to recognizing direct costs of developing the OER, one faculty discussed other indirect costs. The lead faculty estimated the total cost for the GA support for the entire project as $27,000 and further speculated, "Everything else came through our time – [the time of the faculty and the OER technologist] … so maybe [costing] a total of at least $60,000 to $80,000".

In regard to implementing the new textbook, all instructors interviewed felt that, rather than presenting a challenge, the resource provided a benefit. One instructor mentioned the only real impact was updating the syllabus.

Social influence. This construct represents the degree to which an individual perceives that important others believe an individual should use the system (Venkatesh et al., 2003). There was no one outstanding positive social influence identified by the team members. In fact, the lack of social influence was noted more prominently, including from department and college.

Technology self-efficacy. This refers to an individual's personal belief that he or she possesses the aptitude and skills to succeed when engaging with a technology (Moghavvemi, 2014). For this research, this concept revealed the need for skills to create the resource using appropriate technology and the technical understanding of open publishing.

"You definitely have to have a pretty solid set of technology skills to be able to create [a textbook]". This statement by a GA summed up the team perspective about necessary technology skills. When asked how the skills brought to the project by the OER technologist contributed to the overall development of the OER, the team, as a whole, felt those skills were critical. In fact, the technologist shared, "I don't think that I would have been able to get this done in the same amount of time if I wasn't familiar with open source software and open content and copyright".

Facilitating conditions. This is the degree to which an individual perceives that infrastructures are available for support (Venkatesh et al., 2003). Factors discussed here include the need for institutional support, and team support that provides expertise in a variety of areas.

One important institutional step in supporting OER development is through a program such as an OER Grant Project (https://oer.hawaii.edu/projects/). Institutional support also came in the form of providing the suite of tools with which to create and then host the delivery of the OER. The OER Technologist mentioned a final form of potential institutional support: "having policies in place for tenure and promotion that value OER production as a scholarly output".

The interviews also brought to light how very important a team approach became as the OER evolved. The OER technologist shared, "if we had a small [consistent] team, a small crew of people that all know how to do [the publishing tasks] … that would make it so much easier". One faculty shared how important it was to have an OER technologist as part of the team: "I would say [the technologist] was probably one of the most important [members]".

OER-enabled pedagogy Though only one team member, an instructor, applied OP in instruction with the newly-developed OER, other team members reflected on the potential value of exploring OP. Two themes emerged from the interviews: OP has the potential to increase student involvement in their learning; and the potential is not realized on campus at that time.

As outlined earlier, one instructor introduced an OP assignment by having students research a topic of their interest pertinent to the concept of "Health at Every Size". This instructor shared, "… it makes sense to me … that students are taking part in deciding what is important and making those decisions and developing those critical thinking skills about what their textbook should have or that they wish it did have. … It's creative and makes a lot of sense".

In reflecting on OP on campus, the OER technologist indicated, "I think OER-enabled pedagogy showcases what's possible when the content is open. And I think there's a lot of potential in that". However, he cautioned that "I think it would take some time and some effort to design pedagogical tools that could be implemented within a course".

Discussion

This study provides an insight into the perceptions and experiences of one team of university faculty and staff as they created an OER for an undergraduate course, adopted it in their instruction, and explored the use of OP. Findings from this research are important in that they provide an accounting of the process of OER development and application not seen in the

literature. Themes relating to OP were pedagogical in nature and were, therefore, examined outside of the UTAUT framework.

All members of the OER team felt positive about the experience of developing and implementing the OER. The overall goals were to provide a resource free to students and one that was place-based and appropriate for local students. Much research has explored the positive impact on student learning when OER are freely offered (Colvard et al., 2018; Lieberman, 2018). Other research has indicated the importance of place in culturally relevant science education (Sutherland & Swayze, 2012). Instructors in this research were particularly excited about the localization of the content and felt that it positively impacted their teaching experience with the students, which is consistent with outside research (Ivins, 2011).

Findings for several of the constructs in this research parallel those found in other UTAUT research on the topic of OER in higher education. "Attitude" was found to be an important factor in OER adoption. In their research, Huang and Wu (2013) found that "attitude" was the strongest predictor of behavioral intention to use OER. In addition, "effort expectancy" was found to positively impact the intention to use OER in several studies (Kandiero, 2015; Mtebe & Raisamo, 2014; Padhi, 2018). Finally, findings from this study are consistent with other OER-related UTAUT findings in regard to the construct of "social influence". These studies indicate no social influence on the intention to use or the use of OER (Mtebe & Raisamo, 2014; Padhi, 2018; Percy & Van Belle, 2012).

There exists an inconsistency with research in the literature and some of the findings in this research. "Performance expectancy" is important in this research, though not in the findings by Mtebe and Raisamo (2014). However, in support of this finding, research conducted by Padhi (2018) found that performance expectancy had a positive impact on OER use. The research of Jhangiani et al. (2016) as well as that of Percy and Van Belle (2012) support this finding. The most curious and inconsistent finding was regarding the construct of "facilitating conditions". The current research revealed its critical importance through both institutional support and team support. Though the findings of Percy and Van Belle (2012) corroborated this finding in the current research, those from Mtebe and Raisamo (2014) and Padhi (2018) did not.

Though the importance of technological infrastructure was addressed outside of the scope of the UTAUT framework in several studies (Mtebe & Raisamo, 2014; Padhi, 2018; Percy & Van Belle, 2012), technology self-efficacy was not included as a construct in the theoretical framework within the studies referenced here. The current research found that this construct was very important as revealed in themes regarding the skills needed to create a resource and in understanding open publishing. These findings are consistent with OER research conducted outside of the UTAUT framework (Butcher, 2015; Towey et al., 2016).

OER-Enabled Pedagogy
The instructor, who had introduced OP through a research assignment, felt that the students were developing critical-thinking skills through their involvement. The instructor also felt that applying this pedagogical approach was creative and would lead to students taking more responsibility for their learning. In some literature, assignments associated with OP are identified as non-disposable assignments (NDAs; Wiley, 2013); however, "little organized literature exists to effectively define, implement, and, accordingly, empirically evaluate the use of NDAs" (Seraphin, 2018, p. 1). Though there is not a plethora of research focusing on OP, the findings in this research align with the literature, which reveal an excitement and potential benefit to student learning when OP is applied (Dermody, 2019; Hegarty, 2015; Wiley et al.,

2017). This research agrees with that found in a study exploring student perceptions of the use of OP as opposed to traditional educational assignments. In that research, OP was perceived as positive by a majority of students in a multi-institutional study (Hilton III et al., 2019).

The OER technologist pointed out that the development of OER is really the first step in exploring the freedoms that teaching with OER can afford. In fact, because there is little direction in the literature on best practices in implementing OP and because the OP assignment in this research represented an initial first exploration into applying OP, the full potential in this context has yet to be realized. There is literature that explores the potential of OP for student learning (DeRosa & Robinson, 2017; Dermody, 2019) but not a great deal of empirical research that has examined the actual potential (Seraphin et al., 2018).

Recommendations
Future research might include more in-depth study into factors that promote or detract from OER and OP development and use. Future research might also encompass the assessment of student learning when students produce their own learning materials. Some researchers have stressed the importance of localization (Ivins, 2011; Wiley et al., 2014), with recommendations to localize OER included in the 2012 Paris Declaration on OER (UNESCO, 2012). However, there seems to be little research reporting on this specific concept.

The findings from this research have practical implications as well. They have helped to present a realistic accounting of the process in developing an OER. Recommendations emerged from the data that might be taken into consideration when launching an OER development project. The recommendations fell into four main categories. Firstly, institutional support is necessary in order to provide varied incentives such as funding through grants. It is also important to institute programs that promote awareness of OER as well as policies that support promotion and tenure. Secondly, technical support is also necessary. This can take the form of expertise in open resources, accessibility, copyright and licensing, and instructional design. Knowledge of publishing platforms, design for layout and editing, and image creation are also critical in promoting the smooth development of OER. Thirdly, OER development can benefit from the support of a team, who would bring diverse skills to the project. Members would include a project lead, subject matter experts, and members with necessary technical skills. The final recommendation is that a time management plan be developed, one that is both flexible and realistic.

Limitations

One limitation of this research is its generalizability to other contexts (Leung, 2015). It is recognized that there are differences in the academic culture between various institutions and disciplines. In addition, the original team for this project was made up of nine individuals, eight of whom agreed to participate in interviews. The small number of participants may affect the generalizability of the findings; however, this research was well documented, which can boost reliability through replication (Leung, 2015).

Conclusion

This study explored the perspectives of faculty and staff engaged with the development and application of an OER textbook at an institution of higher education. It applied a qualitative interpretive approach through semi-structured interviews with those university professionals

involved with the OER project development and subsequent application in instruction. This included one instructor's experience in applying OP.

These findings can help fill a gap in the literature and potentially provide an informed approach to the planning and development of OER. The data from this research helped to outline factors needed for the support and management of an OER-development project and provided reflections on the challenges and benefits throughout the process.

The participants in this research have already begun implementing a future edition of the OER. This will include edits from feedback originating from instructors, students, and other professionals outside of the campus who are using the resource. The upcoming version will also embed study activities and include a student activity pack and test bank. These features have shown to be very important for the instructors. The instructor, who experimented with an OP activity, plans to take the next step in having students assist in developing a new unit for the OER. Finally, the lead faculty is preparing to develop a new OER for an upper division class for the department. In this research, the process of developing an OER has positively impacted the participants and has opened up potential projects and creative applications of OER.

Acknowledgment

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