ATHABASCA UNIVERSITY

IS "FREE" MORE EXPENSIVE THAN COMMERCIAL?

OPEN EDUCATIONAL RESOURCES AS PART OF A SUSTAINABLE BUSINESS

MODEL FOR POSTSECONDARY INSTITUTIONS

BY

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Abstract

As the cost of post-secondary education rapidly increases in the United States and Canada, it threatens to make education less accessible to students even as the need for university credentials grows. The use of Open Educational Resources (OER), which can lower costs for students and allow institutions to share and collaborate on content development, could help to address some aspects of this problem. The question of whether OER can be part of a sustainable business model for institutions of higher education, making it easier for them to achieve their missions, is crucial, whether in monetary terms or some equivalent measure. The problem needs to be addressed systematically and have appropriate metrics established. This study compares institutions in Canada and the United States that have developed OER programs, analyzing their business models for OER through the case study method. The study explores whether OER can be part of a sustainable business model for institutions of higher education, not only in financial terms but also in terms of other measures of institutional goals and "value." These institutions' practices, policies, and expenditures, and their efforts to incorporate the use of OER into their programs and business models, are examined. This project will also examine the practices of OERu, an international consortium of institutions that are collaborating on the creation of courses and academic credentials that use OER. While more research is needed, results indicate that the use of OER can be part of a sustainable business model for postsecondary institutions.

Keywords: open educational resources, higher education business models, sustainability

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Chapter 1. Introduction and Overview

As the cost of post-secondary education rapidly increases in the United States and Canada, it threatens to make education less accessible to students even as the need for university credentials grows. While there are many factors contributing to this trend, the use of Open Educational Resources (OER) could help to address some aspects of the problem. These can lower costs for students and allow institutions to share and collaborate on content development. Thus, the question of whether OER can be part of a sustainable business model for institutions of higher education is crucial, whether in monetary terms or other important measures. To encourage this, the problem needs to be addressed in a systematic way and appropriate metrics to determine the potential impact of OER must be established.

This project utilizes a multi-case study approach to investigate whether the use of OER can be a sustainable business model in Canada and the United States postsecondary institutions. It examines the practices, policies, and expenditures of several institutions that have attempted to incorporate the use of OER. It also examines the practices of OERu, an international consortium of institutions that collaborate to create courses and academic credentials using open educational resources.

Overview and Background of the Study

At post-secondary educational institutions in Canada and the United States, the already-high cost of attending university continues to climb. This is a major obstacle that can prevent students from earning the educational credentials they need in a labour market that increasingly demands educational and professional certification. These high costs

include not only tuition, with increases that have greatly outpaced the rate of inflation, but also the rising cost of textbooks, fees, and student amenities (Goldrick-Rab & Kendall, 2017). Moreover, the existing structures and practices of traditional higher education, in which 18-to-22-year-old students attend a residential university in order to be shaped by the professors at that institution, represent a teaching model, rather than a learning model (Barr & Tagg, 1995). Such a model, according to Barr and Tagg, places teaching and the instructor above the learner. The resulting instructor-centered, inputs-focused model is not only ineffective, it minimizes the value of the learner's pre-existing knowledge and orientation to learning that would be emphasized in a learner-centered, outputs-focused model (Barr & Tagg, 1995). In the traditional teaching model, teaching by the institution's faculty members is often considered by those faculty members to be the only source of true learning; thus, it is difficult for students to work around this problem of cost. For example, students might prefer to enroll in courses offered by lower-cost, non-accredited providers, or leverage the learning they acquire outside of a traditional university setting toward a university credential through prior learning assessment and recognition, but would be unable to do so at a traditional institution where control over credentialing is still maintained. In addition, though online education options are increasingly available and accepted, most students nonetheless prefer a campus-based learning experience where blended learning is employed, regardless of the learning model (Buzwell, Farrugia, & Williams, 2016; Seaman, Allen, & Seaman, 2018).

In recent years, institutions and individual faculty members have been exploring the use of open educational resources (OER) as part of a potential solution to this problem of increasing costs (Colvard, Watson, & Park, 2018; Hilton, Fischer, Wiley, & Williams,

2016). Early studies of the effectiveness of OER, both as a cost-saver and as a means of improving student outcomes, have provided some cause for optimism. These studies indicate that OER contributes to improved student outcomes, including better course completion rates and improved performance in subsequent courses than commercial materials in similar courses do (Hilton, Robinson, Wiley, & Ackerman, 2015; Wiley, Williams, DeMarte, & Hilton, 2016). For OER to be adopted on a large scale, institutions must see OER as providing students with the resources they need, while at the same time contributing to a sustainable business model for their own operations. Indeed, Hylén (2008) notes that "long term sustainability is currently regarded as the most important challenge to most OER initiatives" (n.p.). This has proven to be more challenging than it might first appear: as Cusumano (2016) pointed out, free education is not free. For institutions to replace commercial textbooks or other course content with OER, they have other costs to consider: labor costs, software and hardware costs, and the cost of acquiring rights to learning materials (Wang & Wang, 2017; Johansen, 2009). One independent study of community colleges in the US (Griffiths et al., 2018) determined that development of an OER course cost, on average, US$11,700, entailing approximately 172 hours of labor, including time spent identifying resources, creating or revising content, and setting up courses, as well as engaging in administrative work, technology-related activities, and other course-related work (Figure 1). Some costs are simply shifted from one source to another, as has been discovered in studies of open source software development as well (Pomerantz & Peek, 2016; Shaikh & Cornford, 2011).
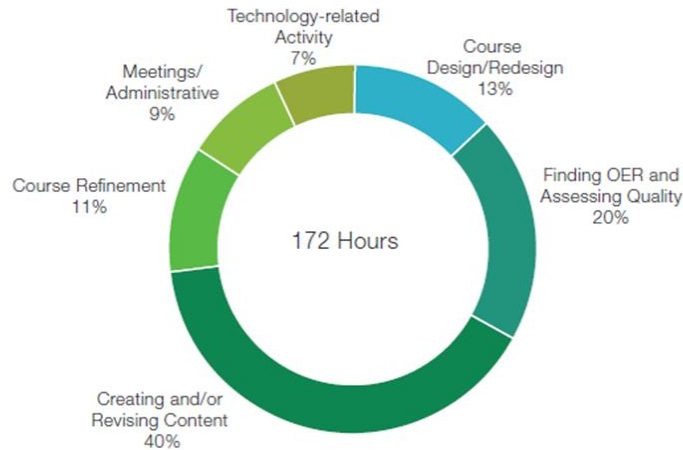
Source: Cost Partner Data; rpk GROUP Analysis

Figure 1. Costs of Developing OER Courses (Griffiths et al., 2018, p. 26).

MOOCs (Massive Open Online Courses) have emerged as forms of learning in higher education in the last decade. These generally use OERs as primary learning material. However, Hollands and Tirthali (2014) found "scant evidence that MOOCs have increased revenues substantially and much evidence that they have increased costs significantly" (Hollands & Tirthali, 2014, p. 20), though this finding conflates the cost of digitization with the cost of open licensing (G. Siemens, personal communication, August 15, 2019). Butcher and Hoosen (2012) point out, though, that there has been limited data to make a useful comparison of costs because instructional design costs vary across institutions and formats, not to mention the availability of existing materials that can be adapted, existing systems, and technical skill. Weller notes that at the very least, "the direct, traceable benefit from open education is probably quite small, and specific" (Weller, 2015, n.p.). Another factor is the university bookstores, which generate revenues from the sales of textbooks to students (Bell, 2015). As for concerns about the effects of

OER on university bookstore revenues, most have already seen a steady decline in revenues from textbook sales because of the rise of online book retailers such as Amazon and the shift to digital textbooks (Griffiths et al., 2018; Jacobs, 2012; National Association of College Stores, 2017). Even without that trend in textbook sales, the university bookstore's share of any textbook's sale price averages 3.7% of the overall price—which translates to about US$5.55 per copy sold (Wiley, 2014a).

One other obstacle that impedes OER adoption is the institutional culture of higher education in Canada and the United States. For many institutions, the idea of providing free resources to students—whether textbooks, full courses (such as MOOCs), or even supplementary materials—with the expectation that this will enhance revenue opportunities runs counter to the dual goals of growth and exclusivity (Christensen & Eyring, 2011; Newfield, 2010). For these institutions, exclusivity is associated with status (witness the ability of Ivy League institutions to deny admission to over 90% of applicants). Exclusivity, in turn, runs counter to the goal of promoting social inclusion that informs the philosophy of OER (Blessinger & Bliss, 2016).

All of this occurs against a backdrop of declining funding of higher education by government, both at the national, state and provincial levels (Meyer, Bruwelheide, & Poulin, 2009; Newfield, 2010). As public institutions are forced to rely on other resources to maintain their operations, programs and operations are increasingly evaluated in terms of their financial sustainability: does this degree program pay for itself? to what extent will marketing affect enrollment? which operations can be outsourced? Some commentators have noted that this change in the higher education sector is the result of a resurgence of a neoliberal model, in which the private sector and market forces are ascendant over the

public sector and institutions that serve the public good, like most universities (C. Jones, 2015; Marginson, 2005). In such a model, universities are measured mostly in terms of financial return on investment of public funds. While it is not entirely clear that this approach is stated policy, governments in Canada and the United States have certainly decreased their per-capita funding of higher education over the past few decades. Government grants have not kept pace with growing enrollments (Canadian Federation of Students, 2013; Davison, 2015; Mitchell, Leachman, & Masterson, 2016; Mortenson, 2012; State Higher Education Executive Officers Association, 2017). Davison (2015) reported that in 2013, Canadian provincial governments covered about 57 per cent of post-secondary costs on average, down from a high of approximately 90 per cent in the 1970s. Similarly, Mitchell (2017) reported that in the United States the average state still spent 16% less per student in 2017 than in 2008 despite the fact that individual states' funding of higher education had increased by an average of 2.2% in the previous year. According to the 2018 SHEEO State Higher Education Finance Report, "public higher education is more dependent on tuition revenue than educational appropriations in over half of all states [in 2017]" for the first time in United States history, despite increased state and local support for public colleges and universities (State Higher Education Executive Officers Association, 2018). This is of particular concern in the United States, where tuition and fees are much higher than they are in Canada, partly the result of political differences and attitudes about the value of postsecondary education to society (Soares, Steele, & Wayt, 2016; State Higher Education Executive Officers Association, 2018; Winslow, 2015).

At the same time, institutions are being held more accountable for their students' outcomes, both in Canada (Diaz Paniagua, 2014; Usher & Pelletier, 2017) and the United

States (Brown, 2017; Winslow, 2015). Accrediting bodies and governments ask such questions as: when students graduate, how much average debt do they carry? what are students' expectations for employment? do degree programs align with workforce development needs? These seemingly contradictory pressures—declining funding and increased accountability—have led institutions to look for cost-saving solutions that create better student outcomes. OER might be part of a possible solution to these pressures if initial obstacles can be overcome.

Statement of the Problem

While it is easy to claim that OER could be part of a solution to the pressures identified above, enough evidence has not yet been gathered to substantiate that claim. Most funding initiatives for the development of OER continue to come from foundations and government, neither of which can be counted on as a permanent solution (Stacey, 2013). Institutions that create OER through grants must still be in a position to continue long-term maintenance of these resources on their own. In addition, the typical post-secondary institutional structure and mindset does not readily lend itself to collaboration with other institutions. There is also a certain comfort level with the existing status quo that relies on commercial enterprises to create content.

Even though some studies indicate that students have better course completion rates and higher average grades in courses that utilize OER (Colvard et al., 2018; Hilton et al., 2016), these improved outcomes do not clearly translate into financial sustainability for an individual institution. As de los Arcos et al. (2014) note, "Often it is difficult for educators to know whether their institution saves money [through the use of OER], and what happens to any such savings. The cost and benefits of free resources are evident (and readily

understood) but greater accountability is required to make these transparent to all

stakeholders" (p. 23). In addition, even if there were a direct link between student success

and OER, there is not a direct path from student success to institutional success. Many

decisions about the use of OER are made by faculty whose motivations might be different

from those of their institutions and students. Some faculty members raise concerns about

quality, as well as potential loss of royalties from sales of their own textbooks (Walji,

2016).

      However, there are two larger issues that are less easily resolved. They involve

more than just the question of institutional revenues and how they can be used to sustain

operations. The first issue is the question of profit versus value. Public education in

Canada and the United States was not established because of the potential for monetary

returns either to individuals or to the government; rather, the impulse arose from a sense of

the common good. It was generally perceived that increased educational opportunities for

all would benefit society as a whole – not only because of the economic benefits that

would accrue to individuals and thence the larger economy, but also because education

would cultivate "an active, civic-minded citizenry appreciative of their ties to others and

capable of sustaining a deliberative democracy" (Antonio, 2013, p. 20) and generate public

benefits that come from research and a more educated citizenry (Longden & Bélanger,

2013; Miller, McAdam, & McAdam, 2014; Newfield, 2016).

      Academic institutions are charged with working to achieve those public benefits.

Whether or not this is the case for higher education institutions in all societies, a particular

institution would do itself and society a disservice by exhausting its resources while

fulfilling that charge. Thus, the importance of generating net revenue must be considered

in light of whether it enables the institution to fulfill its mission, achieve its goals, and live up to its values (Stacey, 2013; Meyer, Bruwelheide, & Poulin, 2009).

For most institutions, fulfilling mission is the driving force that justifies continued existence. In many cases, this includes expanding access to education, and creating and disseminating knowledge (Carson, Kanchanaraksa, Gooding, Mulder, & Schuwer, 2012). In other cases, the stated missions of colleges and universities have served political or social goals of those in power, whether public or private. This was especially true during the emergence of the nation-state in the early modern era, (Aremu, 2015; Nicotra & Patel, 2016; Scott, 2006).

Scott (2006) identified six distinct types of university mission: teaching, research, public service, democratization, nationalization, and internationalization. These all represent some form of service to communities, nations, or those in power. As Wiley (2007) puts it, and regardless of the specific aspects of the institution's mission, "the definition of sustainability should include the idea of accomplishing goals in addition to ideas related to longevity" (p. 5). Dholakia, King, & Baraniuk (2006) saw this slightly differently: they ascribed the value of a service or good to how valuable it is for its users, and not to the institution that creates the good, which exists to provide those services. Thus, value, in their view, is more important than revenue, though again, one cannot provide value in the form of education for any length of time if one is unable to maintain operations.

This raises the question, though, of how to measure the success of an institution in meeting its goals. This, in turn, leads to the second issue regarding institutional revenues and sustainability: whether the goals of an institution belong to the institution alone, or are

shared by, or issue from, the society or nation as a whole. Much of the research in this area takes the work of Gary Becker as its starting point. Becker's focus on the idea of human capital, especially in regard to how education builds human capital, includes "skills and abilities, personality, appearance, reputation, and appropriate credentials" (Becker, 1993, p. 262). He demonstrated a clear link between higher education level and increased earnings, even accounting for other factors. Several studies (Association of Universities and Colleges of Canada, 2011; Goldin & Katz, 2008; Maragakis, Van Den Dobbelsteen, & Maragakis, 2016; McMahon, 2006; Schneider & Yin, 2011) go beyond Becker's work on individual benefits to demonstrate that an increased graduation rate and overall improved educational attainment benefits society as a whole in terms of economic growth, social well-being, and other positive social outcomes like increased life expectancy and lower crime rates.

Nonetheless, this clear set of benefits to society has not necessarily settled the argument, as per capita funding for post-secondary education has continued to decline. Newfield (2016) argued that this is a result of the dominance of the ideology of neoliberalism, which has led to the privileging of privatization over public support of education. The assumption underlying neoliberalism is that privatization can make any public function more cost-efficient, and that "the private sector will adequately fund anything really worthwhile that the public sector was doing before" (Newfield, 2016, p. 112). This assumption has been challenged on several fronts, most notably by Benkler in his work on peer production and Internet commons (Benkler, 2017; Benkler and Nissenbaum, 2006). In any case, the funding that was predicted has not materialized, and many public institutions operate within severe financial constraints.

Working within this framework that tries to establish a link between increased

educational attainment and positive social outcomes, some researchers have attempted to

assign a dollar value to various social benefits purportedly produced by higher education.

Fujiwara (2012), in his study of the value of adult learning in the United Kingdom, noted

that those who participate in adult learning have better health, better social relationships,

more stability in their employment, and a greater likelihood that they will volunteer on a

regular basis. All of these factors translated into a monetary value for the individual and for

the United Kingdom of more than ₤2,300 per individual per year. McMahon, in his work

on the nonmarket value of education (2006, 2015, 2016), extended this approach to include

other financial and social benefits to the state and the individual that result from a more

educated populace, such as reduced use of the criminal justice system, reduced health care

expenses, longer life expectancy, and higher tax revenues. Based on his analysis,

McMahon projected that the private and social benefits of educational attainment greatly

exceeded the amount of money that needs to be invested by the state (McMahon, 2015).

This type of analysis has also been done in other fields in order to show a connection

between social and nonmarket value, on the one hand, and financial expenditure, on the

other; for instance, the US Environmental Protection Agency has calculated the social and

economic costs of carbon dioxide emissions, otherwise known as the "social cost of

carbon" (US Environmental Protection Administration, 2015).

While such studies are enlightening and use data effectively to support their points,

their methods have not been applied to the use of OER as part of a business model. Many

of the existing studies of OER, not surprisingly, advocate for increased use of OER, but

with limited data to support their arguments (Butcher & Hoosen, 2012; de Langen &

Bitter-Rijkema, 2012). Other studies have been limited in their scope, or tangentially

related, as with Anderson's analysis of open access scholarly publishing (2013) or

Johansen's study of conversions of university and high school courses to an open format

(2009). Analyses of other modes of learning, such as traditional, classroom-based and

distance learning models (which often overlap with OER modes), are not effectively

applied to studies of OER, since use of OER brings with it a set of values that reflect the

practices inherent in the use of openly-licensed educational materials (Bernstein, 2014;

Leeds, 2013). Besides open access, these values include the promotion of knowledge

dissemination, increased emphasis on collaboration in the creation and transmission of

knowledge, and increased access across political borders and social classes (Bernstein,

2014; Cape Town Open Education Declaration, 2007).

The problem, then, is whether OER can be part of a sustainable business model for

institutions of higher education, either in monetary terms or some other reasonable

measure. This problem is a significant one: if OER can be successfully implemented as

part of the business models of post-secondary institutions, it could support expanded social

inclusion and access to educational opportunities for more students (Conole, 2012; Stagg

& Bossu, 2016). It could discourage institutional reliance upon publishers for the provision

of teaching and learning resources (Annand, 2015; Butcher & Hoosen, 2012; Leeds, 2013),

while increasing collaboration among educators (Hylén, 2007; McAndrew, Farrow, Elliott-

Cirigottis, & Law, 2012; Stacey, 2012), and creating cost savings for institutions and

students alike (Fischer, Hilton, Robinson, & Wiley, 2015; Hilton, Murphy, & Ritter, 2014).

In other words, incorporating OER into postsecondary education could have a

transformative effect beyond simple cost savings.

Research Question

In order to unpack this problem of whether OER can be part of a sustainable business model, the following research question will be addressed:

Can the cost of OER to an institution be justified if the result enables the institution to achieve its mission more effectively than it would if it utilized commercial materials?

This research question is informed and prompted, in part, by other, larger questions that are of interest to postsecondary institutions in the United States and Canada. These questions will likely remain unanswered by this study. However, it is hoped that addressing the research question will suggest other approaches to these subsidiary questions:

1. Should calculations of cost and benefit be limited to those that are internal to an institution, or should other factors external to a particular institution be considered, such as social and nonmarket benefits (McMahon, 2006), increased sharing of resources, or the economic benefits to a nation of investing in a more educated workforce?

2. Could a metric be designed that assigns a monetary value to some of the key functions and goals of a higher education institution: for instance, how much is an increased retention rate or graduation rate worth to an institution in fulfilling its mission? Specifically, for OER: can a monetary value be assigned to educational outcomes derived from OER implementation?

3. Is a business model that is based on OER *more* sustainable than the models currently in place within higher education? In other words, is "free" more expensive than commercial?

These subsidiary questions are the key to understanding the broader implications of the

research problem. Whether OER is lower-cost or not, the non-quantifiable values

associated with the use of OER should also be considered.

Scope, Delimitations, and Limitations

The economics of higher education is a very broad topic, potentially covering

investment in physical facilities, tuition, financial aid, bookstore operations, fundraising,

human resources, and education as a predictor of individual and societal wealth. Most of

these considerations are outside the scope of this project. This exploratory study focuses on

the value of open educational resources, and how the funding and use of OER are situated

within the budgetary frameworks of select but varied post-secondary institutions in Canada

and the United States. These studies should provide evidence of a range of institutional

practices and allow for a broad application of principles that emerge.

However, all of the institutions studied are publicly funded: two in Canada and two

in the United States. This is a limitation of this study, at least in the United States context,

where private non-profit colleges and universities are not uncommon. The business model

of a private (though non-profit) institution of higher education might very well be different

from that of a public institution, though almost all private non-profit universities in the

United States also accept some public funds, and in return are bound by federal and state

requirements and guidelines. In that sense, they are not as distinct from public institutions

in the United States as private and public institutions are from one another in Canada,

where private institutions receive no public money (G. Jones, 2015; Usher, 2016).

As a result, findings may not be applicable to institutions in countries where the

social structure, funding of education, and the role of post-secondary institutions within the

larger society are different from those found in Canada and the United States. As a means

of addressing and minimizing this delimitation, OERu will be included as one case study.

This is an international consortium of institutions of postsecondary education that includes

members in Canada and the United States, Europe, Africa, the Middle East, and Oceania.

These members collaborate to create OER courses and credentials. The OERu "aims to

create a sustainable innovation partnership between accredited educational institutions

which will provide free learning to all learners with pathways to gain academic credit from

formal education institutions around the world" (OERu, 2017). This and other similar

consortia such as eCampus Ontario and the Community College Consortium for Open

Educational Resources provide options to institutions that do not create their own OER.

These might assist institutions to develop sustainable business models that include OER

directly or indirectly, partially or wholly. Such a mechanism could also serve to promote

the academic goal of sharing of OER, whether initiated by partners in the network or the

institution itself.

An additional limit of this study is the time frame in which the work is carried out.

There is only an approximately twenty-year history of OER utilization within higher

education. There is, to be sure, a history of educational resources being made widely

available at no cost or very low cost, such as through the Open University of the UK or the

City University of New York system (not to mention public libraries), but the practices of

open educational resources and pedagogy, which are more collaborative in nature, is a new

development (Hylén, 2007; Blessinger & Bliss, 2016).

Likewise, the notion of applying a business model to higher education has a

relatively brief history (Ghaziani & Ventresca, 2005; Miller et al., 2014; Zott, Amit, &

Massa, 2011), and for OER, an even shorter one. As a result, the same limit to historical

analysis also applies to business models. The actual limitation of the study, then, is in its

ability to project forward in time: while a long-term assessment of costs, revenues, and

student outcomes would be desirable, it is outside the scope of this study.

Some of these issues are the result, in part, of the current state of research in this

area. As noted, not much work has been done to determine how OER can function as part

of a sustainable business model in institutions of postsecondary education. This will be

discussed in more detail in the following chapter.

Significance of the Study

The economics of higher education are often the subject of much discussion.

Several aspects of this topic have been studied in academic journals and the popular press:

the economic value of a university credential for students, whether a degree is worth the

tuition students pay, the extent to which tuition cost are a deterrent to access to post-

secondary education attainment, or the relative value of a particular major (Baum, 2014;

Maragakis, Van Den Dobbelsteen, & Maragakis, 2016).

Another broadly-discussed problem in the economics of postsecondary education

concerns the relationship between higher education and the economy as a whole (Clark,

2012; OECD, 2012), but that discussion is often based on ideology and rhetoric, without

much supporting evidence (Newfield, 2016; Quinterno, 2012; Winslow, 2015). This is

especially true in regard to discussions of the economics and value of relatively newer

models of higher education like online learning (Christensen & Eyring, 2011; Meyer,

Bruwelheide, & Poulin, 2009), and open educational resources. While there have been

relatively recent studies of possible OER business models (Orr, Weller, & Farrow, 2018;

Downes, 2007; Liyanagunawardena et al., 2015), such work is designed only to suggest possibilities, rather than to demonstrate the effectiveness of one model over another. Such an approach does have its uses: each institution is unique, and what might work at one organization or in one country may not necessarily work elsewhere. On the other hand, institutions should all be able to draw from the same data at multiple levels regarding how higher education functions within the larger ecosystem, and how it contributes to social good and the economy.

This study aims to provide institutions with a financial basis for making decisions about how and whether to utilize OER within their organizations. First, it provides a consideration of the tools institutions can use to derive the appropriate metrics for measuring the value and sustainability of academic programs, both within an institution and within the larger scope of the society in which it operates. These metrics should take into account both the revenues and costs generated by an academic program, as well as the social and nonmarket costs and benefits that have been less easily quantified but are, nonetheless, measurable. Second, the study discusses how institutions might apply these metrics to determine whether OER can be part of a sustainable business model — the financial costs and the revenues generated by them, the values they represent, and the potential advantages and disadvantages they provide.

Chapter 2. Literature Review

This chapter will review relevant literature to illuminate the multiple perspectives and prior approaches to the question of whether OER can be part of a sustainable business model for postsecondary institutions.

The first concern is the cost of higher education. The increasing cost of higher education often prevents students from gaining access to earning the educational credentials they need, especially in Canada and the United States (US Department of Education, 2016; Government of Canada, 2016). To some degree, existing institutional structures that come from outdated pre-constructivist assumptions about student learning (for example, the notion that students are essentially blank slates when they enroll at a university) bear some responsibility in this regard (Johnson & Taylor, 2011; Kazis et al., 2007; Kezar, 2005). In such traditional models, the learning that occurs in a university setting is prioritized over learning that students acquire in informal settings. This makes it difficult for students to leverage the learning they have acquired outside of a traditional university setting toward their formal learning program through independent study, courses taken at other institutions, formal courses outside the traditional higher education structure like MOOCs, or learning that occurs through work or other external experiences. This problem is particularly acute for adult and non-traditional learners (Ross-Gordon, 2011), but it has an effect on all university students.

Another important obstacle in the way of students earning a degree or other credential is the existing educational/business model found in most institutions of higher education in Canada and the United States. This model is linked to the same assumptions discussed above. An institution puts a premium on courses taken at that institution, rather

than acknowledging and accrediting the many ways in which students may acquire university-level learning. Despite the fact that such alternative means of acquiring relevant knowledge and skills have been acknowledged as valid by many institutions (Andersson, Fejes, & Sandberg, 2013), many of these institutions perceive external learning as detracting from a sustainable business model. For example, administrators might ask why students taking courses or earning credit elsewhere would enroll in the same number of the institution's courses and how such lost revenue could be replaced (Seymour, 2014). Such concerns arise despite frequent calls among government, business, and educators themselves to increase the number of adults with a college or university credential and to make such credentials more relevant to the workforce development needs of their nation or region (Brown, 2012; Kazis et al., 2007).

Open educational resources could be part of a solution to this problem. They reduce costs for students and make education more affordable. They thus create more degree-holding adults. Before this can happen, institutions must first see OER as providing students with the high-quality resources. These concerns over quality control have hampered adoption. At the same time institutions must develop a sustainable model for keeping themselves in business. Hylén argued in 2008 that "long term sustainability is currently regarded as the most important challenge to most OER initiatives" (Hylén, 2008, n.p.). As a result, institutions are at present unlikely to invest in a process for developing or adapting OER for their own purposes.

In addition, this study explores whether OER can be part of a sustainable business model for institutions of higher education in terms of non-monetary measures, such as improved achievement of students' educational goals (Hilton et al., 2016). To answer this

question fully, the role of a particular institution within its nation or region needs to be

considered; for example, the value of an increased graduation rate for the nation or society

as a whole. In other words, should calculations of cost and benefit be limited to those that

are internal to an institution, or should social and nonmarket benefits be considered

(McMahon, 2006)? Some of the reviewed literature discusses the value of doing one or the

other and investigates the non-economic factors involved. However, a full examination of

the question is beyond the scope of this study.

Discussion of Critical Terms

What follows is a discussion of some of the terms used in this study. Many of these

terms have been used in different ways by different researchers. Some have emerged or

their meanings evolved over time.

Business model. Ovans (2015) notes that it can be as simple as a description of

"how you planned to make money," the "story" of a business, or the set of assumptions

that makes a business unique (Ovans, p. 52). However, some criticize this idea as too

vague to have any meaning. Massa, Tucci, & Afuah (2017) identified 71 distinct

definitions or conceptualizations of the term. These models were grouped into three broad

categories: (1) as an attribute of a firm, (2) as a cognitive or linguistic schema, or (3) as a

formal conceptual representation describing the activities of a firm. Some scholars even

criticize the very idea of the business model, suggesting that not only is it vague, it is not a

meaningful concept at all (Massa, Tucci, & Afuah, 2017).

The notion of business models in postsecondary education, whether as an academic

concept or as one applied to the institutions themselves, has a similar and briefer history.

The term "business model" first appeared in an academic journal in 1957 (Osterwalder,

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Pigneur, & Tucci, 2005), though Lichy & Enstrom (2015) and Miller, McAdam, &

McAdam (2014) argue that the question of business models for higher education (or,

indeed, for most sectors) generated relatively little interest before the mid-1990s. This is

not to say that the education sector has existed entirely independent of the question of

business and economic concerns. Miller, McAdam & McAdam (2014) make the case that,

even lacking the concept of a business model, universities have had to take business and

economic concerns into account for many years. They observe that the university's role in

economic development and technology transfer has been acknowledged for a century,

though in a more or less ad hoc manner without much clarity as to terms. Researchers and

faculty members, and in fact entire departments and institutions, have regularly engaged in

entrepreneurial activity, though not necessarily conceptualizing it as an element of a

business model nor considering it as a means of sustaining the academic enterprise

(Etzkowitz, 1998).

    Perhaps reflecting a lack of self-awareness (or at best a late-breaking awareness)

within academic circles when it comes to financing and financial sustainability, Lichy and

Enstrom (2015) cite numerous authors who claim that the term "business model" is not

clearly defined, whether in education or in general, and has been applied to describe a wide

number of phenomena within education when it has been used. Turning to the topic of

OER, the concept of the "business model" is defined in one of two ways in the literature on

OER: as a purely economic, zero-sum based revenue model, in which any investment must

be recouped financially (Dholakia, King, & Baraniuk, 2006; Liyanagunawardena,

Lundqvist, & Williams, 2015) or as a broader model incorporating social and political

good as well as economic sustainability. The latter take into account larger-scale factors

beyond revenue (Newfield, 2010; McMahon, 2015).

Other OER studies evoke a combination of these two approaches. De Langen &

Bitter-Rijkema (2012) describe business models in terms of "value." De Langen (2013)

considers the business model for OER as requiring a networked approach that suggests a

shared, collaborative commitment to education through a network of governments,

organizations, users, and individuals. Nonetheless, this is still dependent on a monetary-

based revenue model. Downes (2016) similarly sees higher education institutions as only

one part of the ecosystem for creating and using OER, with the business model for OER

ultimately extending beyond higher education institutions to include corporate and

community training groups. It is this hybrid approach, using a monetary-based revenue

model, but considering it within the larger social and cultural context, that will be

employed in this study.

Sustainability. Closely related to the idea of the business model is the notion of

sustainability. Meyer, Bruwelheide, and Poulin (2009), in their discussion of online

postsecondary programs, begin with the dictionary definition: "a method of…using a

resource so that the resource is not depleted or permanently damaged" (p. 37). From this,

they create a definition that can be applied to an online education context: "those policies

and practices that improve the likelihood that an online educational program will be

financially viable" (p. 37). Similarly, Dholakia, King, & Baraniuk (2006) initially limit

their definition of OER sustainability to "the long-term viability and stability of the open

education program" (p. 2), though they later note that this definition should include the

program's value and usability. Downes (2007) points out that measures of sustainability

must include more than just the cost of producing a resource; they also must include maintenance of the resource, training of staff to manage a resource, and other supporting processes. In line with the previously cited definitions, Downes embraces a definition that "'has long-term viability for all concerned'—meets provider objectives for scale, quality, production cost, margins and return on investment" (Downes, 2007, p. 33). However, he also goes on to note that sustainability often means more than this, depending on the goals of the program: it could also include a continued capacity to promote wider objectives. Wiley (2007) agrees that a focus on a project's ability to achieve its goals is more important than simple continuity of operations. In fact, for many institutions, this is the appeal of OER: institutional goals can be achieved while sharing open resources (Hylén, 2007).

De Langen (2013) goes even farther than Downes in considering sustainability: since a purely open model would involve no exchange of money, the only relevant considerations are non-monetary. Funding has to come in the form of grants and sponsorships, and through the value networks created by the partnerships among various stakeholders. Thus, while there is little disagreement over the need for sustainability, different researchers have emphasized different aspects of it when they have considered OER. Additionally, sustainability is relative. Some business models may be more sustainable than others, meaning they realize better financial and educational results. As a result, the purpose of this study is not only to determine whether OER can lend itself to a sustainable business model, but also whether one model is more sustainable and economical than others, while delivering equivalent (non-monetary) value.

Thus for the purposes of this study, sustainability will be defined to include both

financial sustainability in the narrowest sense—the ability for OER to at least cost no more

than other commercial models currently in use in postsecondary education—and the ability

of OER to enable institutions to fulfill their primary missions while maintaining their

standards. In other words, a sustainable business model for higher education involves more

than making money but also sustaining its values and value networks (Annand, 2015; de

Langen, 2013). Whether sustainability in either of these senses is solely the responsibility

of the institution, or the state or province that supports it is a broader question that cannot

be addressed in this study.

Open educational resources. David Wiley (2007) cites this definition of OER,

approved at a 2002 UNESCO meeting on the topic, where the term originated:

> Open Educational Resources are defined as "technology-enabled, open provision of
>
> educational resources for consultation, use and adaptation by a community of users
>
> for non-commercial purposes". They are typically made freely available over the
>
> Web or the Internet. Their principal use is by teachers and educational institutions
>
> to support course development, but they can also be used directly by students. Open
>
> Educational Resources include learning objects such as lecture material, references
>
> and readings, simulations, experiments and demonstrations, as well as syllabi,
>
> curricula and teachers' guides (UNESCO, 2002, cited in Wiley, 2007, p. 4)

UNESCO's definition of OER has evolved over time. In the most current draft of its

Recommendation on Open Educational Resources, OER is defined as "teaching, learning

and research materials in any medium—digital or otherwise—that reside in the public

domain or have been released under an open license that permits no-cost access, use,

adaptation and redistribution by others with no or limited restrictions" (UNESCO, 2019, p. 2).

The Cape Town Open Education Declaration, a pivotal statement "of principle, strategy, and commitment meant to spark dialogue, inspire action, and help the open education movement grow" (Stacey, 2013, p. 68), expands on UNESCO's definition to include open education in general: "open education is not limited to just open educational resources. It also draws upon open technologies that facilitate collaborative, flexible learning and the open sharing of teaching practices that empower educators to benefit from the best ideas of their colleagues. It may also grow to include new approaches to assessment, accreditation and collaborative learning" (Cape Town Open Education Declaration, 2007).

Kumar (2009) cites the Hewlett Foundation's definition of OER as follows: "OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others. OERs include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials or techniques used to support access to knowledge" (Hewlett Foundation, cited in Kumar, p. 78). However, Kumar expands on this definition to include "open access," which includes "published academic papers, books, reports, and other periodicals that are electronically available to readers without financial or technological barriers" (Kumar, 2009, p. 78). Open access materials in an education context can be viewed as a type of OER in that they can be incorporated into open learning tools for classroom use.

Hylén (2008) observes that OER can be of any digital size, and can include files, text, images, or audio. Licensing can vary, from fairly restrictive to wide open in terms of provisions for reuse. He also notes that OER can come from many sources, whether government, individuals, foundations, or institutions. Olcott (2012a) notes that OER is not synonymous with online or distance learning, though they are often associated with one another and the internet is often the gateway to access for most OER. The key is the license allowing reuse without prior permission, fees, or royalties. Thus, there is no real limit to what can be identified as OER, as long as an open license is in place.

Creative Commons (2016) has gone so far as to create a wiki page that includes several of these definitions, and others as well. Their own definition is general: "free and openly licensed educational materials that can be used for teaching, learning, research, and other purposes" (Creative Commons, 2016). It is this broad definition that will be used for this project as it makes no distinctions among types of resources employed, nor specific reference to technologies and user types.

Historical (?) Overview

As discussed previously, the literature on business models for universities, let alone for OER, only goes back a few years (Lichy & Enstrom, 2015; Miller, McAdam, & McAdam, 2014). As Harney (2013) noted, "the business model concept itself was largely unarticulated in academia until people—mostly business people—started telling higher education to act more like a business." Soares, Steele, and Wayt (2016) asserted that the concept of business models in academia was imported to Canada and the United States via the work of business researchers in Europe, as scholars looked for new models for resource and process development in the face of challenges to the existing status quo (Soares et al.,

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2016). This recent development of thinking about postsecondary institutions through a business lens is true especially for the field of education researchers. For economists looking at postsecondary education, the related notion of student as consumer has likewise been a recent development (Swagler, 1978), as well as the use of research money in generating revenue (Slaughter & Leslie, 1997; Winston, 1999) and the economics of infrastructure development, especially on the international level (Bloom, Canning, & Chan, 2006; Leydesdorff & Etzkowitz, 1996). Recent attention to the question of university business models, their sustainability, and the use of OER have all been generated from the same origins (Christensen & Eyring, 2011):

1. the decline in university funding by the state, which was severely accelerated by the economic crisis of 2008 (C. Jones, 2015);

2. the availability, indeed pervasiveness, of technology that allows people to more easily create and share OER and create related business models (Leeds, 2013; Miller, McAdam, & McAdam, 2014); and

3. the growing emphasis on the knowledge economy as the predominant economic structure in the developed world, and the crucial role of higher education in allowing people to participate in it (Ondercin, 2011; de Langen, 2011; Leeds, 2013; Miller, McAdam, & McAdam, 2014).

As a result, there is some urgency to settle the question of how to build a sustainable business model for universities, whose financial support is declining at the very moment that governments and industry are concerned with economic competitiveness in the global knowledge economy, and students are saddled with increasing amounts of debt. A few related studies have suggested that OER can help address all of these concerns and bring

financial benefits for students and institutions alike, and help them achieve their respective

goals (Wiley, Williams, DeMarte, and Hilton, 2016; Hilton, Robinson, Wiley, &

Ackerman, 2014; Johansen, 2009). However, these studies were of rather short duration

and limited generalizability, and they did not definitively address the question of goal

achievement in any long-term sense. This study will attempt to inform these issues.

Methodological Approaches of Previous Studies

This section discusses the methodologies used by researchers to evaluate OER use

within a sustainable business model, whether used in traditional education, online and

distance education, or predominantly open or OER-based education. In general, the studies

are not definitive, but more speculative and interpretive in nature. They generally use

analytic methods drawn from political or critical theory (Ondercin, 2011; Bernstein, 2014;

C. Jones, 2015). In some sense this is understandable, as any discussion of value

prioritization or the achievement of specific institutional goals is necessarily subjective.

Other studies are descriptive, discussing examples that seem to work well, but without any

certainty or even intention that such examples could translate to other contexts (Dholakia,

King, & Baraniuk, 2006; Johansen, 2009; Dellarocas & Van Allstyne, 2013; Wiley,

Williams, DeMarte, & Hilton, 2016; Orr, Weller, & Farrow, 2018). In other words, the

validity, reliability, and generalizability of their findings may not be high. This is not to

say that they are not valuable: many of these studies provide an opportunity to think

through the goals of higher education (for example, whether those goals are a public or a

private good), how OER can further those goals, how higher education must adapt to new

realities in terms of identifying new funding sources, partnerships, and alliances, and why

an institution might utilize OER. Answers to the latter might include a commitment to

openness and collaboration, or a unique sense of mission or conception of value. All of these may vary by institution and individual.

In relatively few cases, though, do these studies provide evidence that OER use can be sustainable or part of an effective business model, however defined. To more fully consider the issue, this study will closely examine what a sample of institutions value and how finances allow them to achieve their goals. Financial costs and benefits will be considered within each of the case studies as a basis for developing a model. The apparent distinction in the literature between monetary and non-monetary value will also be examined, since this is really a question of how universities can use money to help them fulfill their missions and goals (Lane, 2012; Law, 2016).

Additional Relevant Studies

Other studies conducted detailed evaluations of revenue and costs in the context of stated goals of the educational programs under review but not OER specifically. However, their approaches usefully inform the current study.

McMahon (2015) studied the overall amount of funding for public higher education in the state of Illinois and its relationship to various measures of social good and economic prosperity over a five-year period. An increase of 8.5% in the state's education budget (representing a restoration of previous funding levels) had led to a lower school dropout rate, which in turn would result in higher tax revenues (projecting that people with higher levels of education would earn more income), lower use of social welfare programs, lower rates of prison incarceration, better health, and more. These measures were aggregated as a "social rate of return," which ranged from 9.5% to 15.3% per person over the period, depending on level of education achieved.

Anderson (2013) distilled several business models for open access publication from the literature. The review indicated that articles published in open access format were viewed more frequently and usually cited more frequently than those published in restrictively licensed journals. Anderson argued that this was a desirable outcome. The goal of academic publishing in a networked society is to be read, not to make money. It is this type of study that, if applied to OER, would provide a necessary support for its potential to become a more important part of the higher education curriculum, as it could extend the reach of institutions to those who currently do not have access.

Carson, et al. (2012) tangentially studied the impact of OER, or Open Courseware as they described it, on the finances of three institutions – Massachusetts Institute of Technology, Johns Hopkins University, and Open Universiteit Nederland. They assessed the impact of MOOCs on student participation and recruitment of new students to these institutions as a whole. These factors seemed to have been enhanced by the availability of OER. Whether OER drove recruitment through its function as a form of publicity or as an opportunity for students to "test-drive" a course before enrolling in it is unclear. It is also unclear whether this effect would be observed at other types of institutions. Regardless, a main concern of Carson et al. is cost savings for students. This, rather than institutional sustainability, is a frequently-cited factor in OER studies (Annand & Jensen, 2017; Hilton, Robinson, Wiley, & Ackerman, 2014; Weller, de los Arcos, Farrow, Pitt, & McAndrew, 2016).

Osterwalder and Pigneur (2010) have developed the Business Model Canvas, which, while not addressing OER use, nonetheless provides a useful approach to determining the relative strengths of a business model that incorporates OER into its value propositions and

relationships. Osterwalder and Blank (Blank, 2016) refined this approach to business model generation to apply it to a mission-driven context. These Business Model Canvases consider the interplay of several interdependent subsystems, centered on activities, some congruent and others operating at cross-purposes; and they also take context into account, on the assumption that business models depend on the unique circumstances and situation in which the organization intends to operate (Fiedler, 1964; Foss & Saebi, 2016). In Chapter 5, the Business Model Canvas will be reviewed and applied as a tool that can assist institutions in determining the appropriate relationship among questions of mission, value, and sustainability.

It is also worth noting the relevance of Benkler's work (Benkler, 2013, 2017; Benkler & Nissenbaum, 2006) on what he has called commons-based peer production. Benkler argues that collaborative work on software and internet-based programs utilizing open-source software has proven to be more innovative and financially successful than proprietary work produced by individual firms. "Commons-based" methods including crowd-sourcing and open collaborative innovation, fostered by online repositories like GitHub, have led to faster innovation and capture of greater market share (Benkler, 2017). Benkler further observes that copyrights and patents have historically tended to stifle innovation and diffusion of ideas (Benkler, 2013), though this might not have been their original intent. While this work is not focused on the business models of postsecondary institutions, the implications are clear: a decentralized, networked approach to open resources that is based on sharing and collaboration can encourage the kind of creativity and productive, rather than consumer-based, ethos that should be associated with the intellectual and academic enterprise.

Types of OER Studies

Several of the studies included in this review provide a list of possible or existing

models for OER sustainability, without necessarily endorsing any one model over the

others (Downes, 2007; de Langen, 2011; Dellarocas & Van Allstyne, 2013; Daniel,

Vazquez Cano, & Gisbert, 2015; Burd, Smith, & Reisman, 2015; and Liyanagunawardena,

Lundqvist, & Williams, 2015). In a similar speculative vein, Butcher & Hoosen (2012) and

Lichy & Enstrom (2015) considered international models, which may have limited

application across borders. As Helsdingen, Jansen, & Schuwer (2010) noted after

reviewing business models for 11 existing OER programs, "We do not know which

business models guarantee success" (p. 37). While OER seems to enhance institutions'

reputations and perhaps provide better service to students, it is not clear from the data that

OER enhances learning. Likewise, as Liyanagunawardena, Lundqvist, & Williams (2015)

conclude,

> Some models may be suitable for a particular type of courses and learner
>
> demographics and/or locations, while others may be more appropriate for
>
> other courses. Unless these are quantified by sharing data collected in
>
> these experiments it is not possible to identify these (p. 108).

It would be useful to be able to identify which models might work best under which

conditions, whether those conditions are economic, political, or social.

A number of other studies promote nation-wide business models for adoption of

OER. Kumar (2009) was concerned with developing a national strategy for OER in India

in order to enhance its "agenda of economic and social enhancement" (p. 77). As such, he

saw the necessity of creating a national infrastructure for OER, which would be linked

with an ambitious program for expanding online learning. In his model, India would leverage existing international resources, engage a few select Indian universities to create new content that would address general curricular needs, create OER repositories, and implement new online programs that could make use of this content. He made the case for an even more ambitious program: improving internet connectivity and access around the country, creating a learning management system that would promote easy access to learning, and creating a governance structure, or "meta-organization," that would ensure ongoing support for such a program. This is clearly an ambitious blueprint for national development and support of OER.

Mulder (2013) also discusses the need for a national approach to higher education that includes a vigorous OER policy, citing the Netherlands' Wikiwijs initiative. This is based on the simple notion that "knowledge is a public good" (Mulder, 2013, p. 98). Lane (2012) considered multiple national systems of postsecondary education, and described how OER could still be used to expand access through its adoption by individual institutions within a national system, particularly open and distance education providers, On the other hand, he noted that it might not be easy to incorporate this system into a traditional institution's curricula and practices.

Other studies advocate for government support for OER, but on a somewhat smaller scale. Stacey (2013), for instance, described the investment in OER by New Zealand and the City of Sao Paulo, as well as efforts by BCCampus, the UK's Joint Information Systems Committee, and the US Department of Labor's Trade Adjustment Assistance Community College and Career Training Grants Program to employ OER for a variety of learning needs. Additional government initiatives, such as the Alberta Initiative and

eCampus Ontario, have also been established in Canada in recent years (McGreal, Anderson, & Conrad, 2015). While Stacey was careful to point out that the costs of OER development—"Funding allocated to OER will not just come as grants from government but will come from time investments of individuals, standard educational practices of faculty and students, and strategic goals set not just by government but by schools, colleges, and universities of all kinds" (p. 78)—he saw foundation funding as limited in duration, making ongoing government support as necessary to maintain the significant public benefits that accrue from use of OER.

Weller (2015) also saw a role for government to play in the development of OER but for a slightly different reason: since open source materials can be used by anyone, including those who do not contribute to its development, a "tragedy of the commons" may arise. Institutions and organizations with fewer resources might behave selfishly and rely on others to do the work. Government could play a role in avoiding this situation by mandating behaviors that avoid this, or mandating that a certain portion of state revenues be committed to OER. Such practices would promote the idea that open policies benefit everyone, not just elite institutions. As McGreal (2012) noted, "The internet is the world's intellectual commons and OER renders this knowledge accessible to all" (McGreal, 2012, p. 3).

Annand (2015) also advocates for government to play a larger role in supporting and directing OER development, as there is a "dearth of institutional capacity to meet the staggering projected worldwide demand for post-secondary education" (p. 11). But he also noted that this likely will not happen until the quality of OER is improved, supply issues are addressed, alignment of the economic interests of decision-makers and students is

achieved, and certain changes in the culture of education are implemented: "creating a

mindset of openness, sharing, and collaboration among institutions, administrators, and

teachers to make OER understood and welcomed, and their use sustainable" (p. 10).

Annand and Jensen (2017) proposed a market-based approach that aligns the interests of

financial decision-makers (the faculty members who choose textbooks, and by extension,

their institutions). This could be achieved by having governments create a financial

incentive for institutions by decreeing "that publicly-funded institutions should include the

cost of all learning materials in their tuition fees" (Annand & Jensen, 2017, p. 10).

Another approach is advocated by Newfield (2010), who saw the current reliance on

government funding as precisely the problem that has led to the current crisis in higher

education. According to Newfield, dependence on government support has led to unequal

and inequitable funding, in favor of political preferences for more selective research

institutions at the expense of less selective, open access institutions, and also in favor of

the sciences and engineering programs at the expense of the humanities. Newfield

advocates that faculty from all disciplines step up and become advocates themselves for

more equitable funding of programs, rather than leaving the decisions to administrators.

While Newfield critiqued universities in general, others have also criticized the

current modes of OER production as elitist and serving to perpetuate inequality. This

criticism, and critical reading, comes despite the often-stated goals of OER proponents to

promote "access, quality, and equity" (Butcher & Hoosen, 2012, p. 2). C. Jones (2015)

observed that OER still depends on technology to sustain it, is shaped by that technology,

and that technology is still not available to all of those who would make use of OER, even

while technological developments have made the affordable production of OER possible.

Leeds (2013) points out that

> The OER community is centred on those countries that have developed OERs,
> namely, the wealthy Western countries through donor or government funded
> projects….Thus, there is a real risk that developing nations will be relegated to the
> role of consumers instead of producers of knowledge. Furthermore, OERs might
> actually widen the knowledge gap between developing and developed nations
> (Leeds, 2013, pp. 1493-1494).

Phelan (2012) pointed out that the Massachusetts Institute of Technology (MIT), in

making all of its course materials open and available online, is really using OER as a

marketing tool, while at the same time creating a double standard for education: students

can become autodidacts by accessing the materials online, but those who want to earn a

degree at MIT must enroll and pay for the right to do so. This raised the question for

Phelan as to whether MIT believes the materials themselves are sufficient for students to

have a quality learning experience, or whether actual teaching must occur for the learning

to take place. By extension, then, OER may not provide the opportunities for learning that

its supporters claim for it:

> By making all the materials their students receive freely available [but not
> allowing those who access the material online eligible for a qualification],
> is MIT suggesting that quality learning processes and outcomes, that is,
> MIT degrees, require more than simply access to learning materials, even
> quality materials? (p. 280)

If teaching is necessary for learning, as Phelan suggested, then open materials

without instruction are not sufficient. Phelan expressed hope that the use of OER would

lead to a proliferation of free, high-quality educational materials online. However, without

any guidance or instruction to accompany them, the availability of these materials might

have the unintended effect of hurting the very learners they were intended to benefit,

because they might bring with them an assumption of autodidacticism. In other words, if

the materials are available for free, learners should be able to use them to teach themselves.

As Phelan strongly implied, though, MIT did not make this assumption that access to OER

leads to the same result as its own students gain in the classroom.

Cusumano (2016), a professor at MIT, supported Phelan's point, and also noted that

OER is not free: while digital production makes certain aspects of production less

expensive than they would have been previously, there are multiple costs associated with

creating MOOCs (and by extension the OER they use) that make their production and use

prohibitive to less-affluent institutions than MIT. His concern was that in driving the price

of production down, standards would be lowered in order to ensure continued cost savings.

If these writers are correct, no sustainable business model for OER may be possible if it

leads to the production of inferior, biased, or irrelevant materials. However, neither one

notes that this concern is not specific to OER. Commercial content that OER would replace

is also not free, nor is it free from the danger of lowering standards in the name of cost

savings.

Questions to Be Resolved

The primary tension inherent in the use and adoption of OER as part of a sustainable

business model is the one noted earlier: whether it is appropriate to consider a business

model as comprehensive if it focuses only on net revenues, or, instead, whether "value" (or values) and goals also should be factored into the formula. In fact, this idea of incorporating values into a business model, known as Corporate Social Performance, has been common in the business world for some time (Wood, 1991; Flammer, 2015). This, in turn, leads to the related issue of whether a postsecondary institution is self-contained as an economic or social unit, or is instead part of an ecosystem (Weller, 2015). By extension, the question is raised about the extent to which education serves the public as a whole, and thus should be considered a social good, or is a commodity as in the neoliberal model (Giroux, 2014).

Another tension in the literature is the depiction of OER as either supportive of social goals or as serving primarily individual goals. C. Jones (2015) noted that "the contradiction at the heart of OER is their reliance on institutional support and authority and at the same time being used to promote individual autonomy independent of institutions" (p. 340). Bernstein (2014) asserted that OER is primarily suited to benefiting individuals, who can repurpose resources according to their needs. Olcott (2012b) focused on the same affordance of OER—that it can be repurposed and customized—but in social and cultural contexts. OER can be remixed and altered to suit different social situations. Lane, Caird, & Weller (2014) noted the importance of both, and their interdependence on one another.

However, neither value addresses the role of individuals in producing and sharing OER, and whatever benefits OER might bring to them (Hylén, 2008; Stacey, 2013). At the same time, production of OER has also become a collaborative phenomenon across international borders, as in the case of the OERu (Murphy, 2013; Olcott, 2012b), or the Virtual Exchange Program managed by TU Delft. What seems to be missing in the

literature is a systematic approach to determining OER costs and value at multiple levels: the individual, institution, social, national, and international. Becker's (1993) framework and McMahon's work (2006, 2015) on the economics, and nonmarket and social benefits of higher education provide a good template for carrying out such OER research.

This study is a comparative study of institutions that have developed OER programs, analyzing their business models for OER through the case study method. The goal is to explore whether OER can be part of a sustainable business model for institutions of higher education, not only in financial terms but also in terms of other measures of institutional goals and "value." The project is comparative on at least two levels: among different OER programs at different institutions, and between online and distance programs, and those conducted at traditional brick-and-mortar institutions.

Chapter 3. Methodology

The Participants

This study compares several Canadian and US institutions that utilize OER in some aspect of their curriculum (Table 1). Ideally, these organizations would be significantly different in terms of missions and populations they serve. Practically, the study is limited by the fact that these institutions have in common a commitment to implementing or experimenting with open educational resources. Candidates included public institutions that serve primarily adult and non-traditional learners like colleges (community colleges in the US vernacular), as well as those that deliver courses and programs through online learning. All of these candidates have integrated OER into their curriculum. An additional consideration in selecting candidates for this study was whether they were willing and able to provide sufficient data.

Table 1

Participating Institutions

Participating Institutions					
	Institution A	Institution B	Institution C	Institution D	OERu
Type	Public community college (United States)	Public (Canada)	Public, open enrollment (Canada)	Public, open access (United States)	non-profit organization
Year Founded	1946	1978	1948	1947	2011
Number of Students Enrolled (part-time or full-time)	39,500	26,000	45,000	90,000	N/A
Context or setting	offers two-year degrees and certificates	offers specialized education and training in public safety and justice	urban setting, offering undergraduate and graduate degrees	primarily distance education, large military population	international organization, with over 30 institutional partners

OERu, an international consortium of institutions that are collaborating on the creation of courses and academic credentials using OER, will also be included in this study. OERu is one of only a small number of organizations whose business models could

complement those of traditional institutions and help reduce the costs of using OER, and

may provide an alternative approach to the development of a sustainable business model.

To solicit the participation and inclusion of institutions for this study, I began with

the participating Canadian and United States membership of the OERu. All OERu

members have made a commitment to use OER. While some of the institutional

representatives who I initially approached were unable to commit their own institutions to

the project, other suitable institutions were in turn informally recommended by these

members. In one case, I was referred by one of these colleges in the second group I

approached to yet another institution, a participant in the Open Educational Resources

Degree Initiative overseen by Achieving the Dream, a non-profit organization that has

funded OER initiatives in the United States as part of a larger approach that includes

coaching and holistic assessments of institutional capacity and effectiveness in meeting the

needs of community college students, especially low-income students and students of

color.

Research Design and Methods

While the academic and financial benefits of OER to students have been

established, a clearer sense of the financial advantages to the institutions themselves would

promote more widespread adoption of OER (Annand & Jensen, 2017; de Langen, 2011).

To arrive at a potential solution to this problem, the related question to be considered is

whether the use of OER carries costs to an institution that exceed the costs of a traditional

model that utilizes commercial materials. In other words, is the use of "free" resources

more expensive than the utilization of commercial resources? This is the first step toward

considering the value of OER to an institution, its learners, its staff, and the communities it serves.

   With this practical concern in mind, a pragmatic approach makes the most sense. Pragmatism as a philosophical approach has a long history, dating back to the 19th century writings of Charles Peirce, and continuing on through the work of William James and John Dewey (Johnson & Onwuegbuzie, 2004). As a method of inquiry in the social sciences, pragmatism has experienced a resurgence in popularity because of the increased use of mixed methods of research; however, while pragmatism can serve as the "philosophical partner" for mixed methods research (Johnson & Onwuegbuzie, 2004, p. 16), they are not the same. Pragmatism differs from mixed methods research in its break with a formal epistemology and ontology in favor of a focus on the results that the researcher is pursuing. As Morgan (2014) noted,

   One distinct consequence of advocating pragmatism as a paradigm is to
   disrupt the reliance on a metaphysical version of the philosophy of
   knowledge as a lens for examining social research…. Rather than framing
   the study of social science research as commitments to an abstract set of
   philosophical beliefs, pragmatism concentrates on beliefs that are more
   directly connected to actions (p. 1051).

   Additionally, as Feilzer (2009) observed, "Pragmatists do not 'care' which methods they use as long as the methods chosen have the potential of answering what it is one wants to know" (p. 9). Pragmatism, like qualitative research, is context specific. It also acknowledges the prior experiences of the researcher as inseparable from the goals of the research.

The implication of using a context-specific pragmatic approach is that it may be difficult to generalize the results of research to a larger system or model. However, the case study format and mixed methods of analyses employed therein should usefully inform the research questions, as described below.

The Case Study Structure

The case study method can be characterized as an approach to research "rather than a methodology that can be easily summarized as a single, coherent mode of educational research" (Hetherington, 2013; Zucker, 2009). Case studies can be useful as they are "strong on reality". They allow generalization "from an instance to a class" (Adelman, cited in Cohen, Manion, & Morrison, 2011, p. 292) regardless of the theoretical framework within which the case study approach is used.

The benefits of a multiple case-study approach are well-documented. As recounted in Cohen, Manion, & Morrison (2011), case studies can provide a holistic view of the topic, in that they observe effects in real contexts and often take a complex systems approach to the observation of phenomena. Multiple causes and effects cannot easily be separated from one another (p. 289). Case studies have been viewed as most useful "when little is known about a phenomenon, often as a first step in developing knowledge" (Anderson, Crabtree, Steele, & McDaniel, 2005, p. 679). Cohen, Manion, & Morrison also observed that case studies are often valuable "when the researcher has little control over events, i.e. behaviours cannot be manipulated or controlled" (p. 290). In addition, the case study approach is adaptable to a number of methodologies. It can be tailored to fit the circumstances of a particular set of variables and research goals as long as the intention is to study a set of phenomena in depth (Byrne, 2005; Hetherington, 2013).

In this study, both quantitative and qualitative research methods will be used. Qualitative aspects are discussed first, as they are the primary focus of the study. According to Stake (1995), there are four defining characteristics of qualitative research for the case study approach to be effective and valid: it should be holistic (taking into consideration the interrelationships between the phenomenon under study and the context in which it operates); empirical (based on field observations); interpretive (using a constructivist approach that takes into account the dynamic between researcher and subject); and empathic (accounting for how those being studied view events and circumstances). These characteristics will guide this study.

One initial assumption underlying this research is that postsecondary institutions behave as complex adaptive systems. This means that complex, non-linear organizations such as universities do not organize themselves into rational, well-ordered mechanical systems (Anderson, Crabtree, Steele, & McDaniel, 2005). There are convoluted, non-linear, non-hierarchical interdependencies among the members of institutions, and among them and their counterparts in external entities. Such institutions are also self-organizing and self-regenerating (Cohen, Manion, & Morrison, 2011; Hetherington, 2013). This means institutions can adapt and incorporate innovations of any type into their business models and curriculum, though perhaps not rapidly. In addition, uncertainty and paradox are inherent within these systems, and change is relatively constant. Individuals within the system must act independently and be creative decision makers (Fraser & Greenhalgh, 2001). A case study approach informed by this kind of complexity theory could examine not only the elements of an institution in isolation, but also, and particularly, the interdependencies among those elements (Etzkowitz & Leydesdorff, 2000; Hetherington,

2013). This is true whether the various units within the institution are aware of their connectedness or not. All of this makes it difficult to compare one institution to another.

These concepts will be explored as they arise from the case studies. Attention will be focused on such interdependencies and relationships, as it is these interactions among entities within an organization that create the whole. In addition, the research will focus on dynamics, patterns, and processes rather than static events. As a result, the design of qualitative questions will be flexible enough to accommodate changes based on initial data collection and interpretation. Two or three research or "issue" questions will lend a modicum of structure to the interviews and document review, but should not chart the course of the studies in advance (Stake, 1995; Yazan, 2015).

Using this approach, the organizational dynamics of the studied institutions may describe multiple paths to adoption and incorporation of OER: for instance, some through unilateral, executive fiat and others through the kinds of recursive, non-linear processes that are inherent in complexity (Etzkowitz & Leydesdorff, 2000; Hetherington, 2013). Whether that might lead to different approaches to using OER is still unclear.

The second aspect of the case studies is quantitative analysis. The analysis of financial data actually will be conducted before the qualitative research described above, as it informs this aspect of the study. The quantitative analysis is somewhat secondary in importance as it will be chiefly used to determine alignment of OER use with institutional mission or goals. Each institution has a different sense of how expenses and revenues can be employed to achieve its mission. Because of this, successful implementation of OER will be defined differently for each institution. Analyzing financial activities without

consideration of institutional mission and goals may not produce accurate measures of success.

Financial data will be analyzed for each institution as follows:

- costs, including where money was spent, and on what;

- revenues, including where revenues and funding came from, how pricing was established, and how it might have affected revenues;

- comparisons to costs and revenues of other non-OER programs;

- whether the OER project is now financially self-sustaining;

- changes over time, where ascertainable.

This should help to determine:

- how and to what extent the reviewed institutions are investing in OER;

- how the costs involved in the use of OER (whether toward the creation of their own resources or the adoption of existing resources) compare to costs associated with commercial content;

- how the use of OER has affected retention rates and graduation rates;

- how participation institutions see OER benefiting their institutions and students; and

- the extent to which external funding has played a part in the implementation of OER.

Questions designed to elicit this information are intended to be consistent enough across cases to provide some basis for comparison among institutions. Thus, they will be more structured. This in turn should highlight any differences in financial results. While individual institutions may respond differently to similar situations, an evaluation of

quantitative financial measures as proposed should produce relatively more objective

results. Though these are grounded within institutional contexts, financial results are less

likely to be mediated by researcher and participants' interpretations and definitions of

sustainability and successful implementation.

Variables such as other costs, differences among instructors and curriculum (for

example, the possibility that OER might be available more readily in some subjects than in

others), retention and graduation rates, and institutional motivations for utilizing OER (de

Langen, 2011) will also be considered during this phase. Consideration of costs and

revenue will act primarily as a means to provide a more rounded description of a particular

institution's experience. For example, if an institution has introduced OER into a few

courses but not all, some comparisons might be established among these courses: OER vs.

OER, or OER vs. commercial learning materials. Other factors, however, such as

differences in marketing or the effects of fees charged to students, also need to be

considered (Johansen, 2009). Finally, and importantly, how institutions see OER

benefiting their institutions and helping them fulfill their missions needs to be considered.

Some of this information will be obtained through public sources such as websites and

publications, but most will be elicited through interviews with administrators who have

budgetary responsibility or who can provide insight into measures of academic

effectiveness and student outcomes where possible. These interviews will be subjected to

interpretive analysis.

Analysis will also include the effects of OER use on institutional revenues. Wiley,

Williams, DeMarte, & Hilton (2016) and Hilton, Fischer, Wiley, & Williams (2016) have

established that OER use results in cost savings to students, which improves course

completion rates. This in turn allows the institution to retain revenue that might have been

lost had these students been forced to drop out because of funding issues. Other studies

(Raisman, 2013; Schneider & Yin, 2011) have taken a macroeconomic approach in their

examination of the cost of attrition and low graduation rates. They noted that these costs to

institutions and states run in the billions of dollars, though the studies did not consider

OER effects. One goal of this study is to link this line of research to the data generated

through the institutional case studies to determine how much of an impact OER can have

on these measures of success for institutions.

One potential challenge in gathering this data is the sensitivity of these institutions

regarding disclosure of financial information. To mitigate this problem, publicly available

data was used whenever possible. In addition, there should be no need to delve into the

inner workings of each institution's budgets, as OER is typically a small part of any

institutional budget. The institutions to be included in this study are publicly funded.

Because more transparency is mandated for public institutions, much of the financial

information needed is publicly available. Even so, funding and financial reporting models

vary among states in the US and provinces in Canada (Deering & Lang, 2015; State Higher

Education Executive Officers Association, 2018), and some effort to establish a basis for

comparison will be needed.

Conclusion on Research Methods

Ultimately, it is hoped that these case studies will have helped to answer the

research question to be addressed in the study:

Can the cost of OER to an institution be justified if the result enables the institution to

achieve its mission more effectively than it would if it utilized commercial materials?

This will establish a basis for evaluating cost and how it relates to institutional mission. This discussion of costs can also include a consideration of financial barriers to the adoption of OER, if warranted. It will also help to begin to address the subsidiary questions:

1. Should calculations of cost and benefit be limited to those that are internal to an institution, or should other extra-institutional factors be considered, such as social and nonmarket benefits (McMahon, 2006), benefits to other institutions through the sharing of resources, or the economic benefits to a nation of investing in a more educated workforce?

While this study focuses primarily on the institutions themselves, and not on the larger role they play in their communities and regional and national economies, it may help to identify gaps between the resources utilized by the institutions and the benefits and public good they contribute to the larger society. In other words, it will be useful to explore the costs of providing education relative to the monetary and non-monetary benefits to society that result from providing that education.

Research to determine a conclusive answer to whether analysis of costs and revenues should be limited to the individual institution would be useful for most Canadian and US institutions, not only in shaping their business models but also their missions and relationships to the societies in which they participate. Both types of assessments can and should be done, though it is hoped that through this research a clear rationale for favoring one measure over the other would emerge. An analysis only of the larger social and nonmarket benefits of higher education that does not include an assessment of the

institutions themselves may overlook the need for efficiencies, ongoing improvements, and a focus on achievement of outcomes at the individual institution level. On the other hand, an analysis of only the costs and revenues at the institution level could essentially embrace the privatization/neoliberal model that presents higher education as entirely accountable to itself. The need to consider institutions as part of the larger ecosystems in which they operate would be overlooked (C. Jones, 2015; Newfield, 2016). Ideally, this research might enable institutions to argue for the allocation of additional resources from the state. If OER does make a significant contribution to achievement of missions, it might provide an effective argument in favor of increased use of OER.

However, at this stage, the answers cannot yet be provided for this question, nor the second subsidiary research question:

2. Could a metric be designed that assigns a monetary value to some of the key functions and goals of a higher education institution: for instance, how much is an increased retention rate or graduation rate worth to an institution in fulfilling its mission? Specifically, for OER: can a monetary value be assigned to openness?

Ultimately, though, it is hoped that the results of the study will point toward a clearer answer to the larger question:

3. Is a business model that is based on OER more sustainable than the models currently in place within higher education? In other words, is "free" more expensive than commercial?

In fact, analysis of the results obtained through the case studies described above will likely determine whether these subsidiary questions can even be addressed in greater detail in the future. Some lines of subsequent investigation beyond the scope of this project are suggested by these initial findings. While these subsidiary questions cannot be definitively addressed or resolved in this study, developing a data set along the lines described above might pave the way for research that does address these questions. Whether this is possible is dependent on the analysis of the information gathered through the case studies.

Desired Outcomes

The desired outcome of this study is to determine a resolution to the problem:

Can OER be part of a sustainable business model for institutions of higher education, whether in financial terms or in terms of some other meaningful measure, or both?

Analysis of case studies of several higher education institutions as well as national and international data will illuminate market and nonmarket benefits of OER. This will be informed by relevant OER financial data. The goal of the study is to determine if a sustainable OER business model may be possible in higher education.

The study also suggests the means to develop a metric that values certain institutional goals. For instance, how valuable is it to an institution or its sponsors and supporters to increase the graduation rate by one percent? What dollar amount can be assigned to a decreased attrition rate, or a more meaningful relationship between an institution and its community?

There is an implicit assumption that this study's findings will be generalizable in some sense. In line with a constructivist approach to research, as described by Lincoln,

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Lynham, & Guba (2011), the validity of the findings of this research will be limited to a

particular context: higher education institutions in Canada and the United States. These

institutions can be viewed as contributing certain nonmarket benefits to the societies in

which they function. Institutional business models will vary by necessity, as public and

private support of such institutions, tuition and fees, faculty and administration support of

OER, and social and economic climate all will vary over time and place. As Lincoln,

Lynham, & Guba noted, validity in regard to qualitative analysis can be difficult to define.

The question to ask is "Are these findings sufficiently authentic . . . that I may trust myself

in acting on their implications? More to the point, would I feel sufficiently secure about

these findings to construct social policy or legislation based on them?" (p. 120). If a

suitable metric can be designed to measure the impact of OER on the achievement of an

institution's mission, future policy might be developed with more confidence.

Ethical Considerations

This study does not involve human subjects and so does not need ethics approval.

While interviews were conducted with administrators at each institution, the discussions

were relatively objective and focused on OER policy and information about revenues and

costs. Administrators in some cases provided access to relevant policies and procedures,

and confirmed their accuracy.

Institutions have not been directly identified, but have instead each been assigned a

letter (e.g., Institution A, Institution B, etc.). Thus, the choice of institutions was not

subject to review by the University's Research Ethics Board (G. Leicht, personal

communication, January 3, 2018). The Research Ethics Board (or in the US, Institutional

Review Board) of each selected institution made the same determination that ethics review was not necessary.

In addition, I was initially concerned that the discussion of sensitive financial information may impede the study. Some institutions might prefer not to make such information public. This would have posed a dilemma, but the issue did not arise in any case. If this issue had arisen, it would have been necessary to explore the concern and come up with an approach that minimized an institution's exposure.

Data regarding student performance will be aggregated and anonymized (for example, data on changes in an institution's graduation rates over time). No students' personal information will be revealed.

Summary of Steps in the Research Process

1. Collect information regarding mission, values and goals of institutions from institutions themselves and other sources.

2. Conduct case studies, including interviews, to gather information on institutional use of OER, financial expenditures on OER, cost/revenue comparison to other methods, and measurable benefits of OER.

3. Review and analyze existing research and institutional data sets regarding demographics, education, and the effects of education on social and nonmarket benefits of postsecondary education to establish relationships between higher education and overall value to societies.

4. Determine the relationship between increased use of OER and positive outcomes for postsecondary institutions, both financial and mission-based (e.g., increased graduation

rates, improved connections between higher education and community/workforce

development needs).

5. Determine the possible economic value of OER as part of a sustainable business model

for institutions in Canada and the United States.

Chapter 4. Results

Introduction

The findings of the study are presented in this chapter. These are grouped into two sections. In the first section, each of the institutions is described in some detail, in order to provide descriptive context. The second section briefly addresses the commonalities and synchronicities among the institutions under examination, including any patterns in the data. Additional analysis is described in Chapter 5.

Case studies were conducted for four higher education institutions – two in Canada, and two in the United States—as well as for the OERu. All of the institutions included in this study are publicly supported institutions, as distinct from private non-profits, which are fairly common in the United States, enrolling 30% of all degree-seeking students (Chingos, 2017). Private non-profit postsecondary institutions are less common in Canada.

The institutions do, however, differ in other ways. One (Institution A) is a community college (granting two-year associates degrees) in a relatively affluent suburban county in the Eastern part of the United States. Institution B is a specialized postsecondary institution in Canada that offers education and training at its own campus and in partnership with other universities and organizations at other locations around the country. The third institution, Institution C, is a large urban university in Canada with extensive degree programs at the graduate and undergraduate levels. Finally, Institution D is a very large, primarily distance-education, comprehensive university in the United States, offering both undergraduate and graduate programs, including a limited number of doctoral degrees.

The primary approach in these case studies was to begin with an analysis of each institution's published (whether in print or online) documents relating to its mission, strategic plan, and policies relating to OER. The assumption underlying this initial step was that the existence of such a written policy might help to confirm that the institution would be able to provide information about its use of OER and possibly its business model for implementation. In addition, review of each institution's mission was also needed to verify that the institutions had in fact attempted to articulate or formulate an OER policy. These two steps were necessary to verify that the use of OER was consistent with the mission and values of each institution, rather than representing the work of an individual actor or "institutional entrepreneur" working against the institutional grain (Hasanefendic, Birkholz, Horta, & van der Sijde, 2017; Wisdom, Chor, Hoagwood, & Horwitz, 2014). If the use of OER was in fact the result of a single individual's or department's efforts, it might undermine the assertion that OER was being used by the institution to bolster or support an institutional policy or goal.

Though institutional websites and publications were employed extensively during this part of the research process, these references are excluded from the reference list at the end of this document, as including them would be certain to reveal the identities of the institutions. In such cases, sources are identified only generally, though others that might include the institution among a group of others, and do not reveal the institution's identity, are included. For example, a set of statistics from an institution's website might be cited within the text as "Institution B, Fast Facts webpage." This restriction does not apply to the OERu case, however, as obscuring the details of this organization's identity would have been extremely difficult; the OERu is likely to be well known to most readers of this study.

In any case, the leadership of the organization objected to anonymity, given its overarching

commitment to openness in all aspects of its operations. In addition, since the OERu is

unique among these cases in that it is not itself an institution of higher education and has

no students of its own, but is in fact a consortium, a unique entity with unique practices,

anonymity did not seem necessary.

With the exception of the OERu, none of the institutions included as case studies

here specifically mention OER in their published missions (Appendix A). This is perhaps

not surprising, as many institutions adopt mission statements that are more general and

overarching, rather than identifying a specific method or approach. In fact, the use of OER

is addressed in the Strategic Plan of almost all of these institutions, with one exception.

Also notable is that only one of the four institutions refers to itself as an open institution in

its mission statement: open universities, while varying in their scope and goals across the

world, are typically distance-education providers with more or less open admissions whose

primary mission is to expand access to postsecondary education to adult and non-

traditional learners, often utilizing innovative teaching and learning methods in order to

build system capacity and challenge traditional approaches to education (Tait, 2008).

Following this stage of institutional mission and policy review, I attempted to

identify an individual or group of individuals in each organization who would be able to

serve as guides through institutional policies, budgets, and planning, as well as to any data

relating to the organization's use of OER. In each case, I was in fact able to identify

members of senior leadership who could verify the existence of such policies and practices,

as well as to provide access to financial information on the use of OER. This was done

partly with the assistance of leaders in OERu and the non-profit organization Achieving

the Dream, as previously noted in Chapter 3, as well as through personal and professional

contacts of my own.

In most cases, this was a fairly easy process. OER programs tend to be centralized

in a single office or unit of the institution. Nonetheless, the process was time-consuming,

as in several instances the senior leaders who were initially identified and approached

declined to have their institutions participate in the project. I had expected to encounter

reluctance to share information about sensitive financial data, but this turned out not to

have been a concern for any of the institutions I approached. In most cases the reason cited

for declining was that the needed data was not accessible, or that they were uncertain as to

how the data could be compiled. In one case, staff turnover contributed to lengthy delays:

just as the research project was beginning, the provost at that institution, who had pledged

to help, resigned; shortly thereafter, the vice provost who replaced her accepted a provost

position elsewhere; the subsequent temporary acting provost was too busy filling two

positions at once; and the newly-promoted vice provost who agreed to assist was assigned

other duties. Ultimately, the situation stabilized, the leaders took pity on me, and this

institution was included in this set of case studies.

To make the goals of the research project clear to the institutional representatives, I

developed a "Data Gathering Prospectus" that was essentially a summary of the

dissertation proposal, focused on the data gathering aspect of the project (this prospectus is

included as Appendix B). Besides being an overview of the project's goals, the prospectus

included a broad overview of likely questions that I hoped to be able to answer. These

questions, adapted from Chapter 3 of this dissertation, concerned the following topics:

- costs, including where money had been spent, and on what;

- revenues, including where revenues came from, how pricing had been established, and how it might have affected revenues;

- comparisons to costs and revenues of other non-OER programs;

- changes over time, where possible.

In addition, the data gathering prospectus described the general goal of these case studies, as being designed to determine the following:

- how and to what extent the reviewed institutions are investing in OER,

- how the costs involved in the use of OER (whether toward the creation of their own resources or the adoption of existing resources) compare to costs associated with other, non-OER curricular materials,

- the extent to which external funding has played a part in the implementation of OER,

- how the use of OER has affected retention rates and graduation rates,

- how they see it benefiting their institutions and their students, and

- how the institutions see OER as part of or compatible with their goals and missions.

This data gathering prospectus served as an entry point into the project for the prospective participants, as well as a means of bringing them into the study so as to minimize misunderstanding or suspicion as to the goals of the study. As such, the prospectus made clear in advance exactly what kind of information would be gathered and how it would be used. It should be noted that the research question was revised slightly during the write-up, so what appears in the prospectus is not exactly the same as the one referenced throughout this study. In no case, however, did the discussion of the prospectus

lead to any changes in the plan, whether initiated by the participants or by me. This is,

primarily, because the questions were "topical information questions" rather than "issue

questions," a distinction made by Stake (1995). Because the individuals who were

interviewed were not intended to be the subject of the interviews nor of the case studies,

the questions posed to them were intended to gather "information needed for description of

the case," which is necessary because "a commitment to common topics facilitates later

cross-site analysis" (p. 25). Issue questions, on the other hand, often require respondents to

help the interviewer identify the nature of a set of issues, and in so doing, respondents are

likely to reveal their own opinions and biases. Since the interviews were intended to

function as opportunities to confirm institutional policies or to direct the researcher to

needed resources, asking issue questions would have been outside the scope of the

interview. In this way, the interviews were more like quantitative interviews than

qualitative ones.

Once institutional representatives had agreed to participate, I followed up by

supplying them in advance with a list of the specific questions I intended to ask. (These

appear as Appendix C.) Broadly speaking, the questions focus on four main areas: costs of

OER, revenues derived from the use of OER, results in terms of student success, and future

plans for the use of OER. Most respondents did review the questions before the interview

took place. None suggested any changes nor expressed concerns about any of them.

However, during the actual interviews, I realized that two of the questions were

inappropriate or not applicable in any of the institutional cases. These were the questions

that pertained to pricing: specifically, "How was pricing established?" and "How did

pricing affect revenues and/or student participation?" In none of the cases had special

pricing been established for courses or other services that involved OER, nor had revenues

from OER-specific offerings been measured based on price. (The OERu, on the other hand,

responded to these questions differently, considering them as they applied to institutional

membership fees, as will be discussed shortly.)

Otherwise, for the most part, the questions were asked in the order in which they

appear in the questionnaire, unless the respondent, while providing the answer to one

question, also volunteered information that related to a later question, thereby making the

later question redundant. In a couple of cases, the interviews went off on tangents, whether

related to the subject at hand or not. Though it was not the intent of the researcher to

encourage this sort of digression, respondents often engaged in a kind of storytelling to

illustrate their institutional practices. Cohen, Mannion & Morrison (2011) and Stake

(1995) both note the importance of storytelling as a useful data source in case study

research. It is important, however, to point out that while stories can inform case studies,

"Case study reporting is not simply storytelling" (Stake, 1995, p. 127). In these cases,

anything relevant that emerged from these tangents is included in the discussion of the case

study of which it is a part, and is noted as such.

Responses and data gathered as part of the research process were analyzed in light

of the main research question: that is, whether the use of OER was integrated into the

institutional business models, and if so, whether the business models were sustainable, or

the institutions had a goal of sustainability as part of achieving their missions, with OER

contributing to that goal. Additionally, an understanding of how OER related to each

institution's mission was key: alignment of an innovation such as OER with institutional

mission and values can be just as important as, and might even outweigh, leaders' concerns

about financial sustainability, at least at the outset of the OER initiative (Wisdom et al.,

2014). However, the focus for this project is on the question of business models and

sustainability. As such, relation of OER to mission and values is a secondary

consideration, though institutions that consider the use and implementation of OER would

need to consider the fit of OER with their mission in order to improve the likelihood of

success (Carson, Kanchanaraksa, Gooding, Mulder, & Schuwer, 2012; Law, 2016; Olcott,

2012b).

Individual Case Studies

  Institution A. Institution A is a public, county- and state-supported community

college in the Eastern United States. It is an open-access institution established

immediately after World War Two, largely in response to the passage by the US Congress

of the Servicemen's Readjustment Act of 1944, also known as the GI Bill, which included,

among other provisions, funds for tuition for returning military veterans to attend high

school, college, university, or a trade school. The GI Bill led to a massive influx of

veterans into education programs: by 1947, veterans accounted for 49% of all college

admissions in the United States ("Story of the GI Bill," 2012). A similar bill was also

enacted in Canada (Lemieux & Card, 2001). Since that time, the mission of Institution A

has evolved and expanded, but like most community colleges in the US, it serves multiple

roles out of necessity: it provides expanded access and affordability to postsecondary

education, opportunities for transfer to four-year institutions, career training opportunities,

developmental education, and community services (Treat & Barnard, 2012; Bailey &

Averionova, 1999). Institution A now has several campuses across its county, and

additional locations where courses are offered. The institution reports that its total annual

enrollment in both credit and noncredit programs averages 60,000 students.

  Because of this history, Institution A's current mission statement (see Appendix A)

is lengthy, but it is compatible with the use of OER. Specifically, in the section of its

website and catalog entitled "Our Mission, Vision, and Values," Institution A states the

following:

   We are here to ensure that every student—regardless of ability, background,

   economic status, race, or age—has access to higher education. One of our main

challenges is to focus on equity in success. This means that we provide all students, including those from disadvantaged backgrounds who typically don't perform as well in college, with the assistance, opportunities, and tools not just to attend college but to effectively reach their goals. Our job is to ensure that everyone has the ability to achieve success by redesigning our institutions for those outcomes. (Institution A, Our Mission, Vision, and Values)

This sense of responsibility to expand access and equity resonates with similar sentiments found throughout the OER movement, though it is not exclusively the province of OER (Butcher & Hoosen, 2012; Cape Town Open Education Declaration, 2007; Carson et al., 2012). The link between OER and access via increased affordability is more explicitly stated in Institution A's Open Education webpage:

[We are] committed to providing OER course options leading to degree completion (commonly called Z-degrees). The [Institution A] Open initiative aims to

1. Promote student success by encouraging faculty to redesign courses using Open Educational Resources and pedagogy that engage, connect and support student learning.

2. Make education more affordable by reducing or eliminating required costs for course materials.

3. Decrease time to degree completion by giving students the option of applying money towards an additional course rather than to books or other required course materials and by providing clear paths to degree completion. (Institution A, Open Education webpage)

Thus, the institution's OER initiative is designed to help fulfill its mission of promoting student success. The institution's Vice President for E-Learning, Innovation, and Teaching Excellence emphasized the importance of social justice in the institution's mission. He noted that the primary rationale behind the institution's approach to OER and other initiatives was that when students succeed, more students participate in classes, and the institution benefits. The county, which provides 53% of Institution A's operating funds, has demonstrated strong support for this concept as well, according to public documents.

OER is also discussed in some detail in its Academic Master Plan. However, in that document, OER is considered as an example of the institution's ability to embrace new technologies and delivery modes in keeping up with change in higher education. Among the technologies and innovative approaches cited in the Academic Master Plan are distance education courses in synchronous, asynchronous, and hybrid formats; a MOOC to help students improve their writing; open content to replace commercial textbooks, and OER to provide students with "on-demand access to instructional resources"; and "dozens of discipline-specific software applications to provide course content and training that meets industry standards," as well as state-of-the-art technology in classrooms, labs, and libraries (Institution A, Academic Master Plan).

With these factors as motivation, particularly at a well-funded institution located in one of the wealthiest counties in the United States (US Bureau of Economic Analysis, 2016), the institution's leadership did not seriously consider cost when the idea of integrating OER into the curriculum was introduced in 2012. This is not, however, to say that cost was not a factor: the implementation of OER at Institution A only took form in

2015 via the Z-Degree (referring to zero textbook costs) program managed by Achieving the Dream, a non-profit organization focused primarily on community colleges in the United States. Achieving the Dream, largely grant-funded, provided Institution A with as much as $200,000 over three years as part of its OER Degree program, which involved 38 community colleges across the US. As important as the funding, however, was the technical assistance that the institution received via Achieving the Dream.

   Where money was spent, and on what. Institution A spent almost all of the money budgeted for OER—approximately $250,000 over three years, including $60,000 of its own funds—on faculty release time, which is time off from teaching to allow faculty to work on adapting OER content for the institution's courses, and also developing courses that utilize OER. This is atypical of the general approach used by the other institutions involved in the Achieving the Dream program: a survey of all participating institutions found that only about half of their investment in OER was spent to support instructors' course development activities and payments, but 43% of money went to cover administrative and other support expenses (Desrochers & Staisloff, 2018). Institution A either spent no money on administrative support or did not take such support into account when calculating costs. This failure to account for such expenses is an indication of the difficulty of measuring the overall costs of OER, and indeed any kind of curriculum development or any other initiative, to an institution.

   In all cases at Institution A, faculty members were given time to adopt and adapt existing OER, rather than creating their own new resources. The effort initially involved nearly one-third of all full-time faculty at the institution. By late 2017, 91 courses had been converted to OER, replacing the commercial textbooks previously in those courses. The

Vice President who described this project acknowledged that by spending so much money, the institution was simply shifting the cost of textbooks from students to itself, but the hope was that the money spent on OER would somehow come back to the institution by way of improved retention and graduation rates. This was borne out by the initial data: in 2017, student engagement in so-called Z-courses (measured in terms of time spent in courses, and number of times online course spaces were accessed) and success (course completion and passing rates) showed modest improvements over "non-Z" courses (Table 2). For example, students who took Z-courses in 2017 earned nearly 80% of credits they attempted, in comparison with students in non-Z courses, whose success rate was less than 60%.

Table 2

Student Success at Institution A

Student Success by Ethnicity in Face to Face Courses				
Ethnicity	Spring 2017 Z-Courses	Spring 2017 Non-Z-Courses	Fall 2017 Z-Courses	Fall 2017 Non-Z-Courses
Black/African American	80.72%	75%	76%	74.90%
Hispanic	87.10%	82.20%	78.30%	81.00%
Asian	85%	82.80%	81.40%	81.60%
White	82.30%	79.90%	77.60%	79.30%

Credits Attempted vs. Credits Earned						
	Spring 2017			Fall 2017		
	Attempted	Earned		Attempted	Earned	
Z-Courses	10,651	8,505	79.85%	19,302	15,370	79.60%
All Courses	249,505	145,715	58.40%	259,153	141,242	54.50%

(Source: Institution A presentation, March 2018)

Comparisons to costs and revenues of other non-OER programs. Institution A has not done any comparisons of costs concerning any aspect of OER development and implementation, and how that might relate to their typical approach to curriculum

development using commercial textbooks and ancillary materials. As appears to be the

case with most postsecondary institutions, costs of instructional design and curriculum

development are not often tracked or isolated from other costs. In the case of Institution A,

as previously noted, cost to the institution was not as great a concern as social justice and

student success. Since student grades and engagement demonstrably improved, the

introduction of OER was deemed by the institution to be a success.

The implementation of OER does seem to have had few, if any, negative effects on

the students attending Institution A. Aside from improved completion and success rates,

students in Z-courses at Institution A reported that teaching quality and course materials

were as good or better than those in non-Z-courses (Achieving the Dream, 2017). More to

the point, however, Institution A is considering the additional expenditure on OER in light

of these improved outcomes. Wiley (2014b) refers to this as "learning outcomes per

dollar," which is a ratio comparing the percentage of students passing a course with the

cost of the required course textbook and other course materials. In this case, the cost to the

institution increased for each Z-course, but the passing rate in those courses also increased

by 20 percentage points, and that learning outcomes per dollar ratio was considered

acceptable by the institution.

Changes over time, if known. Initially, Institution A lacked an overall plan

regarding the use of OER, and development of Z-courses hinged upon the ability to solicit

the interest of individual faculty members. Thus, the first Z-courses were in the areas of

expertise of those interested faculty members. However, now that OER has become a focus

of the Academic Master Plan, this scattershot approach has given way to a more systematic

plan for implementing OER. The institution is now targeting higher-enrollment classes for

replacement of commercial textbooks with OER, including General Education courses that are required for all students, as well as identifying course sequences that make up specific degrees. At the same time, the institution still looks to interested faculty members and academic departments to take the lead: the Early Childhood Education academic department at Institution A has become especially enthusiastic about OER, so they are replacing textbooks with open resources in all of their courses, whether high-enrollment or not.

Institution B. Institution B is a public institution in Western Canada offering courses of study that lead to certificates, diplomas, bachelor's degrees, and a few graduate certifications, as well as continuing and professional education. It is unique in Canada in that its mission is focused on justice and public safety programs. Because of its focus on these areas, Institution B also partners with other institutions, government agencies, and non-profit organizations around Canada and the world to provide customized programs of study and professional development. In recognition of the increasing complexity of public safety and justice, Institution B was founded in the 1970s to provide training for police, corrections, fire, courts, and related educational services. According to institutional documents, only a few years before, there had been no formalized approach to training in most of these subjects anywhere in the province. Additional areas of study were added over the next decade, and the institution was ultimately organized into several schools.

Neither the institution's mission statement nor its strategic plan specifically addresses the importance of OER for its students and partners. However, a large portion of the strategic plan is focused on business development, and does include as a goal the following: "Increase financial sustainability through fiscal discipline and new revenues."

One action the institution will take to accomplish this is to "Grow revenues from existing sources and develop new, incremental, and sustainable revenue sources" (Institution B Strategic Plan, p. 13). Because much of the institution's business model involves revenues that it derives from partnerships and contracts for developing curriculum and training for other institutions and organizations, this section of Institution B's strategic plan is relevant to the utilization of OER. In fact, the use of OER goes directly to the question of a sustainable business model: by utilizing OER in the training programs they design and deliver across the country, they are able to save themselves money developing these programs, and can replicate them for and share them with other partners. Later revisions to such programs are done when necessary due to a change in the curriculum, rather than being driven by the revision or discontinuation of the commercially produced materials they formerly used. In addition, because the use of OER led to lower costs of materials for the trainees and students using these programs, enrollments increased, which Institution B sees as benefiting its partners.

The use of OER in this manner also led to two other changes: first, more courses were developed in online formats, which meant that they could be offered across the country, saving partners travel costs for trainees and students. Second, Institution B shifted its own revenue model to one in which they charged students for the end-of-program assessments rather than for the courses themselves. This revenue model also functions as an outcomes-focused curricular model, in which mastery of the course content is emphasized over time spent in a classroom (Biggs & Tang, 2011). Such a model provides more flexibility to those utilizing the training, allowing them to vary the pace of the

courses or to adapt them to specific needs, as well as allowing for the possibility of prior learning assessment and recognition.

Where money was spent, and on what. Institution B spent very little money on OER development, or rather, dedicated very little money to OER-specific course development and related programs. Instead, the institution leveraged existing development budgets and simply replaced commercial materials with openly licensed ones. Institution B estimates that over eight years, it spent $20,000 total on OER-specific initiatives. The institution found that OER-based curriculum development did not need to cost more than its traditional methods, and in fact, as noted above, it could generate revenues to pay for itself. Part of the reason for this low cost was the fact that the institution adapted existing materials wherever possible. For example, adopting a set of OER courses in Human Resources Management from a large Canadian university saved Institution B an estimated $15,000 in course development costs. The institution also adopted courses from other Canadian institutions, adopting them whole for the most part, with very little adaptation. Because of this, in contrast to Institution A, outside funding has played a minimal role in the development of OER at Institution B.

Almost all of the cost of OER was in hiring subject-matter experts. In cases in which the institution decided to incorporate open textbooks into courses, they hired subject-matter experts to adapt content, or they used faculty who were either hired on separate contracts specifically to review and adapt OER content to courses or who were granted course release time to undertake these reviews. Because all courses at Institution B are created using this approach, very little modification of the methods was needed, and costs were not affected in any significant way.

Comparisons to costs and revenues of other non-OER programs. As noted

previously, there was very little difference in cost between Institution B's traditional

approach to course and curriculum development and their approach using OER. As they

had always adapted commercial textbooks and materials for their use previously, there was

very little difference in budgeting and expenses. Revenues, however, were affected by the

use of OER. As noted, the lower cost of the OER-based programs led to enhanced

revenues. This occurred in two significant ways. First, while OER utilization was

essentially cost- and revenue-neutral during initial stages of use, OER allowed Institution

B to keep its costs down in later cycles of curriculum management. This resulted in lower

costs to Institution B for their own course offerings and continuing education programs, as

well as in their contract programs, even when such contracts with outside agencies did not

take this lower cost into account. This meant that cost savings were not necessarily passed

along to clients, and instead were returned as benefits to Institution B. Clients did,

however, benefit from the use of OER in other ways: OER programs could be reused and

revised as needed, and the use of OER lowered costs (such as for materials) for trainees,

employees, and students who participated in these programs, and their enrollments

increased. This in turn led to expanded partnerships between Institution B and these client

organizations and partners. Also, for at least one province's emergency management

agency, OER use provided the incentive to move some of its training programs online,

which in turn saved the organization money in allowing them to scale the cost of program

delivery.

Generally, the use of openly licensed materials has increased the institution's

visibility, which institutional leaders believe in turn has increased enrollment in, and usage

of, these programs. Institution B has used the availability of OER to promote their

programs, and enrollments have increased 10% in the eight years since the institution

began using OER in its offerings. In addition, with its focus on public safety, justice, and

law enforcement, the institution's mission—"develop[ing] dynamic justice and public

safety professionals through its exceptional applied education, training and research"—is

furthered by the reduced program costs made possible through the use of OER. At the

same time, Institution B's increased visibility as a partner in the development of these

programs has increased public perceptions of their expertise, around Canada and

internationally, leading to increased demand for their programs and services. For example,

their openly licensed course on fentanyl safety has received international recognition

(Institution B, 2017-2018 Institutional Accountability Plan and Report).

  Changes over time, if known. As Institution B has completely adapted its

curricular and course development to an OER-focused approach, it has shifted from a

model in which it adopted existing open content with only minimal modification to one in

which primarily, they create their own OER. Some of this shift is out of necessity because

of the discipline-specific nature of their curriculum. As they have moved into newer areas

of law enforcement and topics such as intelligence analysis and cybercrime, existing OER

is harder to find. The process of course development still does start with investigations into

what already exists, but typically, specialized materials are not available in more recently

developed areas of the curriculum.

  In addition to these changes, Institution B has begun to invest more heavily in the

development of a shared open platform for course delivery. It is working with the

Organization for Educational Technology and Curriculum, a consortium of about a

thousand educational institutions in the US and Canada that leverages the size of the organization to negotiate on behalf of their members and share programs and resources. Institution B will be moving to this new platform because they recognize that ongoing improvements to their educational technology are needed to keep the institution's programs viable and to extend their reach.

Institution C. Institution C is a large, public, open enrollment university in Ontario. Its student enrollments of over 39,000 undergraduates, 2,600 graduate students, and 12,000 continuing education students makes it among the largest in the province. Similar to Institution A, Institution C was founded immediately after World War Two, in large part to provide opportunities for training returning veterans in an effort to provide skilled workers who could keep pace with the rapid growth in technology in the workplace, according to institutional historians. The buildings initially occupied by the institution had been used during the war as a training facility for the military and for military-support trades. As a result, whether intended or not, the institution came to be seen as a successor of that previous facility, initially focused on "short trades-oriented programs geared to prospective job markets" (Institution C, History webpage).

Later developments in programs and curriculum continued to build on this general approach of providing practical training to urban workers, providing education both in trades and in technology, and expanding access to those who might not otherwise pursue postsecondary education and training. The university (it earned University status in the early 1990s) also founded an Open College in 1971, modeled on the Open University of the UK. Many Open College courses were offered over the radio in an open format. Institution C's mission continues to reflect this commitment to open access and practical

education: "The special mission of [Institution C] is the advancement of applied

knowledge and research to address societal need, and the provision of programs of study

that provide a balance between theory and application and that prepare students for careers

in professional and quasi-professional fields" (Institution C, Accountability-Mission

webpage).

Much of Institution C's work in OER has originated in and been driven by its

School of Continuing Education, which is focused on lifelong learning and helping adult

learners achieve their life and career goals. While OER is referenced neither in the

institution's strategic plan nor that of the School of Continuing Education, the Director of

Digital Education Strategies reported that the institution has come to see OER as an

extension of the distance learning courses it previously offered via radio broadcast and its

later efforts, dating to 2008, at creating digital documentary videos that it posted online as

supporting materials for certain courses. In fact, the institution's first openly licensed

resource was an audio recording of interviews with prominent Canadians that were

originally produced for the Open College radio courses. The focus of the OER initiative

now, though, is to "provide access to education to a wide variety of learners" (Institution

C, Open Educational Resources webpage).

According to representatives of Institution C, OER integration into Continuing

Education courses was done in an ad hoc, almost haphazard way, starting in the late 1990s.

At that time, the idea of OER was not well-established, and in fact the term had not been

coined yet (Murphy, 2013). However, Institution C's efforts in this regard, while they

would not have been referred to as OER, likely incorporated a number of precursors to

OER such as learning objects and open licenses (Hylén, 2007; Leeds, 2013). This was

done without a sense of any need for consistency or purity of open licensing (Weller et al., 2016). As a result, the institution is not entirely sure how extensive the use of OER has been in its 280 credit-bearing courses, nor its 180 noncredit offerings; staff estimates of OER content among courses range from 50% to 90%. As of September 2018, the institution has completed the first stage of a systematic review of these existing courses to determine the amount of open content in each. They have found that 151 courses do not require students to purchase a textbook; however, whether this is conclusive evidence that these courses are OER-based is not certain.

Unfortunately, the lack of data on these courses means that the institution has not been able to determine whether there are any differences in revenues between courses using open content and those using commercial materials. There is also no data on student outcomes for either type of course. However, they have begun to make a more concerted effort to track the effectiveness of newly developed courses in the past two years, and they hope to have comparative data in the near future. Because the School of Continuing Education at Institution C is the largest of its kind in Canada, with approximately 70,000 registrations for its courses annually, the instructional designers revise and/or create 80 courses per year, so the impact of their use of OER on student outcomes and revenues could be significant. At the moment, though, neither staff nor students are aware of the extent to which courses are OER-based. Because of this, there is no pricing differential between OER courses and others, nor are students informed in the institution's catalog as to which courses will be offered with a commercial textbook or other materials. Of course, some courses require the purchase of a textbook, and others do not, but there has been no systematic cataloguing of that fact.

In the same way that Institution C has not tracked outcomes or revenues for OER-based courses, it has also not had an institution-wide strategy in terms of integrating OER into curriculum development, nor had it given much consideration to the benefits of OER for students or for the institution as a whole. This has begun to change in the last year or two, as the School of Continuing Studies is currently drafting a set of guiding principles for the staff and administration to assist in strategic planning for the incorporation of OER into the curriculum and technological tools. Library staff have become increasingly involved in locating and recommending open resources to students and staff members. In addition, a module on OER has been added to the online training program for instructors, informing them as to how to modify and create open content as they develop and teach courses.

Where money was spent, and on what. As noted, Institution C, for most of the time it has used OER, made no distinction between curriculum development that uses OER and that which employs commercial materials. As a result, it is difficult to estimate the amount of money dedicated to one or the other approach. In fact, OER and openly licensed learning objects were first utilized simply as a cost-saving measure, both for the institution and for the students, but ironically, actual costs have not been measured. Generally speaking, each course developed through the School of Continuing Education costs an average of about $30,000 to develop, according to the Director of Digital Education Strategies, regardless of whether OER is utilized or not. Occasionally, money must be spent to convince copyright holders to open up their licenses.

Creating new content is more expensive, however. To keep costs down, Institution C will adapt existing materials when it is possible. To that end, it is a member of the OERu

and several other institutional consortia which share resources and expertise. However,

when necessary, and when funding is available, the university will create new OER. A

recent example of this was the development of five open textbooks on digital accessibility.

No such works existed previously, and the institution spent $280,000 on development of

all five (Table 3). These funds were spent on marketing, instructional design, and

instructor fees for piloting the course, though most of the money spent on OER is for

subject-matter experts.

Table 3

Institution C Breakdown of Project Milestones as of September 2018

Project Activity	Performance Measure	Performance measure target	Comments
Create Professional Web Accessibility Auditing Open Textbook	Open textbook published	One open textbook published	First open textbook published for public distribution
Create Digital Accessibility as a Business Practice Open Textbook	Open textbook published	One open textbook published	Second open textbook published for public distribution
Create jQuery WAI-ARIA Plugin for Web Accessibility for Developers Course	jQuery WAI-ARIA plugin V1.0 created	One plugin released as open source software	
Create Course Content for Web Accessibility for Developers Course	Course content completed	One course	
Deliver Web Accessibility for Developers Course	Number of participants registered	200	
Convert Web Accessibility for Developers Course to Open Textbook	Open textbook published	One open textbook published	Third open textbook published for public distribution
Create Content for Introduction to Web Accessibility Course	Course content completed	One course	
Deliver Introduction to Web Accessibility Course	Number of participants registered	500	
Convert Introduction to Web Accessibility Course to Open Textbook	Open textbook published	One open textbook published	Fourth open textbook published for public distribution
Create content for Understanding Document Accessibility Course	Course content completed	One course	
Deliver Understanding Document Accessibility Course	Number of participants registered	300	
Convert Understanding Document Accessibility Course to Open Textbook	Open textbook published	One open textbook published	Fifth open textbook published for public distribution

In addition, as noted previously, Institution C now spends considerable amounts of effort, and thus expenditures for staff time, on adaptation of technology, as well as on training and process planning. For example, Institution C is part of a project supported by eCampusOntario to create the infrastructure needed to support the development of OER in the province of Ontario. The project includes the creation of an accessible open library for post-secondary students looking for high-quality OER textbooks and other materials; software enhancements to support collaborative creation and publication of OER on the existing platform; tagging of metadata; data migration; outreach activities; and system integration. The project involved dozens of staff members, including instructional designers, library staff, web developers, and IT application development staff. While funding was provided by eCampusOntario, the utilization of so much staff time would certainly require significant investment on the part of Institution C. Nonetheless, an overall institutional budget for OER is still difficult to determine.

Comparisons to costs and revenues of other non-OER programs. As noted previously, comparisons of OER programs to non-OER programs at Institution C are difficult to make. Institutional tracking suggests that there is a significant time savings for staff when the institution adapts OER content from eCampusOntario resources, rather than creating its own courses using commercial content. While the tuition charges for courses are the same regardless of OER content, there is usually a cost savings for students in the OER courses, in that they do not need to purchase a textbook. The School of Continuing Education has determined that this price differential does have an impact on revenues in terms of course registrations: OER course enrollments have increased anywhere from 7% to 12% per year over the last three years, compared to 3% growth for other courses over

the same time period. Many of these other non-OER courses continue to be based on commercial content because they are not offered online; certainly, then, the difference in growth rates could also result from the difference in evolving preferences for these delivery formats just as easily as it could be the result of OER usage. Also, since Institution C's OER-based courses are not advertised as such, it would be unlikely that students could express a preference for one or the other.

This lack of access to data is emblematic of many institutions' lack of awareness of their own budgetary requirements and strengths, or at best a lack of coordination between the parts of the institutions that handle finances and those that design programs, to say nothing of the idea of business models (Annand, 2015; Brown, 2013). This will be considered in more detail in the Discussion and Analysis in the next chapter.

Changes over time, if known. As the overall goal of the initiative is to expand access to postsecondary education at a reasonable cost, in keeping with the institution's mission, Institution C's leadership is aware now that it must assess the program and align it with the existing operations of the institution in order to ensure that OER does indeed help its students, but does so in a manner that is sustainable.

The major change in Institution C's approach to OER has been that they are now attempting to do a better job of systematizing their processes. The changes in this regard are significant if traced from the institution's initial steps in the 1990s, developing digital documentaries, to the present, where the institution is mindfully and systematically developing courses based on OER, at the same time as it is incorporating elements of adaptive learning and gamification into many courses. Faculty and staff are now receiving training on how to use and incorporate OER into teaching and research; research is

underway to measure the effectiveness of OER and other innovations implemented by the

university; and plans are being drawn up to make students aware of the availability of

OER.

Institution D. Institution D is a large, public, open-access university located in the Middle

Atlantic region of the United States. It was, like two of the other institutions in this study,

founded just after World War Two, largely to serve adult and non-traditional learners,

particularly military veterans who were encouraged through the US GI Bill to return to

school and learn a trade or acquire a degree. It grew out of an evening program for adult

students that had been established at its state flagship institution in the 1920s, but the

mission of the program eventually came to diverge significantly from that of the flagship

university by the end of the war, emphasizing professional development, flexible

scheduling, and off-campus teaching locations. The institution was established as a

separate entity by 1947. Within a short amount of time, Institution C had begun to establish

locations on US military bases, ultimately extending to over 100 locations on several

continents.

For the most part, the institution's mission is the same as it was in at the time of its

establishment. The mission is "improving the lives of adult learners." This is to be

accomplished by focusing on three main goals: "Operating as [the state's] open university,

serving working adults, military servicemen and servicewomen and their families, and

veterans"; offering "career-relevant education, embracing innovation and change" aligned

with the institution's purpose; and providing "affordable, open access" to higher education

(Institution D, Mission and History webpage).

It is this last goal—affordable, open access—that has driven the institution's efforts to create a completely OER curriculum. The institution receives relatively little money from the state legislature—approximately 8.8% of its funding comes from the state, according to the state's FY2017 Executive Budget—with the bulk of the rest coming from tuition and fees. From 2012 to 2014, the enrollment of the institution had been declining, partly due to a reduction in military funding of service members' education, but also because of demographic changes in adult students and increasing competition from other institutions entering into the distance learning market (Deming, Lovenheim, & Patterson, 2016; Lichy & Enstroem, 2015). The challenge of serving active-duty military service members was particularly acute because the US military's Tuition Assistance Program, which funds service members' education costs, does not include the cost of textbooks (Military OneSource, 2018). The institutional leaders considered ways to address this decline. This led, according to published accounts, to a renewed focus on its "academic core": expanding access to working adult learners, many of whom had expressed concern about the rising costs of textbooks and other course materials, and redesign of academic programs to emphasize practical, experiential learning. Within this framework, OER is one part of an "Enhanced Learning Model" designed to benefit adult learners.

Institution D employed a "top-down" approach to its OER program, as no less than 700 courses were to be converted to OER, with the ultimate goal of no textbooks required in any course offered by the institution. To accomplish this, the president of the institution established a firm 18-month deadline for implementation of the program across all undergraduate courses and departments. The effort of identifying digital resources was performed by teams in each discipline comprising a program chair, one or two core faculty

members, a librarian, and an instructional designer, all specializing in course development. Once identified, resources were released to the faculty who taught the relevant subject, so they could provide their own input. Staff members were assigned to the project in their areas, and were expected to do this new work on top of their own existing workload. Adjunct instructors were paid to review and identify suitable OER materials for their own courses. Perhaps not surprisingly, staff turnover was high during this period, as noted in legislative budget documents.

Because of the centralized plan and accelerated timeline, during the 18-month period Institution D focused more on adapting and adopting existing OER rather than creating its own. The institution's project leaders consulted with other universities that had experimented with open source materials and technologies, and collaborated with those universities and other organizations that have worked on OER projects, such as Lumen Learning. Based on those organizations' recommendations, the project teams began with known databases and repositories, identified appropriate materials, and then subjected them to a review for quality and learning efficacy. This approach was effective for the courses at the undergraduate level, but at the graduate level, fewer adaptable materials exist, so that part of the project required the creation of new OER. Work on undergraduate course materials was completed by December 2015, though work on graduate courses continued for an additional year.

Where money was spent, and on what. This approach made it difficult to determine where money was spent, as there was no financial plan underlying the project. The focus of the initiative was on time, rather than cost. In any case, it was difficult to measure the costs of identifying and adapting resources, since most of the work was

carried out by existing staff members and absorbed into their existing workloads. All consideration of finances was put aside in service to the ambitious and perhaps unforgiving timeline. In addition, no maintenance plan or efforts at sustainability were put in place during the 18-month-long project. Over time, the project leads did determine that course development using commercial materials and course development that required creating new OER were roughly equal in costs, but curating existing OER was cheaper than creating their own resources. According to one of the project leaders, the Vice Provost and Undergraduate Dean, "What content costs to develop depends on the content. Writing a text(-based) learning resource of a few pages might be a few hundred dollars in payment to the SME (plus editorial costs, but with editors on staff, we don't really isolate staff costs). Writing a complicated resource, creating a simulation, producing a video, etc. would be more." However, there was little data to provide a detailed breakdown of this.

Later efforts to expand and create new OER were funded in part by the Gates Foundation. After 2015, when the initial project was completed, it became evident that to maintain this large endeavor, maintenance plans had to be put in place as part of an effort to stress continuous improvement. Since 2016 Institution D has invested heavily in technical and software systems to curate, manage resources, create a taxonomy. While originally, there was no thought given to acquisition of systems or other new programs or resources, as of September 2017, Institution D acquired Adobe Experience Manager, a content management system. Annual costs of maintaining such tech infrastructure amount to more than a million dollars.

Interestingly, Institution D has also figured in other hidden costs into their overall calculations. One such cost includes the loss of revenue from textbook sales via its

bookstore and licensed online book providers. The institution estimates that students have saved $10 million per year as a result of the OER initiative, and some portion of this money would have come to the university through textbook sales. In fact, "auxiliary revenues"—those revenues deriving from auxiliary enterprises, which may be related to or supporting of academic functions, for example parking fees or, in this case, textbook sales from the campus bookstore—declined 95% in one year as the institution launched its OER program, from $1.248 million in 2015 to $62,000 in 2016. However, as the institution is the state's open university, reducing costs for students is a primary concern, and this outweighs the financial cost to the institution. In this case, though, the institution's enlightened self-interest has benefited them, as enrollment has increased by 10% over two years, according to published reports, and revenue from tuition and fees increased 1.5%, over $4 million, from 2015 to 2016.

Comparisons to costs and revenues of other non-OER programs. Early analysis done by the institution indicate that course development costs are the same whether the course developers use commercial materials or existing OER that they adapt for their own use. As noted previously, creating their own OER does carry additional costs, but the costs vary depending on the nature of the resources. In addition, Institution D has begun to collaborate more closely with Lumen Learning, an education technology company that partners with higher education institutions to help them transition their courses to OER (Lumen Learning, 2018). Drawing on Lumen's existing course materials in order to refresh and maintain their courses, they believe, will keep costs low; however, the institution's leaders are considering charging students a small ($25 or $35) "technology fee" in each course to cover some of the cost of OER development.

Revenues have increased as enrollment has increased. While it is probably not the case that all of the increases in enrollment are attributable to OER use, as the university also initiated more extensive use of data analysis and risk modeling, leading to more rapid advisor intervention and operational efficiency, at the same time as it was launching its OER initiative, Institution D does attribute some of its recent increases in student success to the increased affordability of its courses and programs. A small student and gradebook surveys indicate as much: students in OER classes seem to do a little bit better (in terms of grades earned and completion rates) than those in non-OER courses did previously. While the numbers from these surveys are not statistically significant, they served to confirm to Institution D that, at the very least, students had not been impacted negatively.

One challenge that makes it difficult to compare OER expenditures to non-OER is the fact that systems and processes utilized by Institution D to manage the conversion of courses have evolved over the years since the OER project was initiated. Institution D is more open to collaboration with outside organizations and other institutions to develop resources and create project management tools than it was previously. It also has begun to take the lead on OER projects within the state higher education system, overseeing the creation of a statewide repository and "referatory," a sort of annotation of items in the state repository. Acquiring a new content management system to manage OER development and workflows was an added cost, but the previous piecemeal approach made it difficult to measure and compare effectiveness and costs, because it was not organized as a single system. The new content management system, however, can be expanded to serve other institutions within the state system, and thus the state has made some efforts to assist with the cost of the system.

Changes over time, if known. There have been significant changes in the approach taken by Institution D as it has converted its courses and systems to OER. At the outset in 2013, there was no financial planning or tracking in place; no attempt to systematize or organize the work or the products of the work; no strategic approach to the adoption of OER; no rubrics or other measures of quality of materials. While the original plan was basically a textbook replacement project, now the institution is more disciplined in its definition of OER, which has expanded to encompass all classroom resources and library materials. Since the completion of the original 18-month project, a maintenance plan has been put into place at urging of faculty. In fact, it was recognition of the need for continuous improvement that led to the current planning now underway. As courses are reviewed and updated, more new content is being created, rather than adopting existing materials as done previously, because the institution has a clearer understanding of their specific needs, not to mention that there is less of a time constraint than had previously existed. This costs more than simple adoption of existing OER, which is why the institution is now considering the addition of the per-course technology fee to defray costs.

Currently, the university's 20 largest-enrollment courses are being revised. The questions that drive this work now are the following: Are the resources good? What's missing? How well do the materials work in the classroom? An important, additional question that is still being worked out, though, is: How do you do this in a data-driven way? For example, Institution D has no data yet on how the OER project might have affected academic persistence and graduation rates.

Institution E: OERu. The fifth and final case study to be considered is the OERu, whose

full name, Open Educational Resource universitas, "draws on the original etymology of

'universitas magistrorum et scholarium' [community of teachers and scholars], reflecting

the spirit of OERu as a global network of accredited universities, polytechnics, community

colleges and educational agencies cooperating on open education approaches" (OERu,

"About OERu," 2018a). The OERu was launched in 2011 by the OER Foundation, itself

founded in 2009 "with the goal of using open education as a means to provide leadership

and international networking, as well as supporting educational institutions to achieve their

strategic objectives" (OERu, "About OERu," 2018a). It consists of a network of

approximately 30 institutions and educational organizations spread across five continents,

with a small administrative staff based at Otago Polytechnic in New Zealand. The mission

of the OERu is ambitious: to link the shared mission of community service common to

many universities around the world with the potential of OER to help make education

more accessible and affordable, thus creating a "'parallel universe' of post-secondary

learning opportunities to complement and augment formal education provision, especially

for those who lack the means to follow traditional learning paths" (Mackintosh, 2016).

Specifically, the OERu would collaboratively develop and/or assemble a series of open

courses, which ultimately could be accessed by any learner with an internet connection,

and connect those courses to create pathways for those learners to earn university-level

credit toward a meaningful credential or degree. It is the only international OER

organization focused on academic credit.

According to the Director of the OER Foundation, to promote collaboration and

transparency, OERu endeavors to conduct all of its work as openly as possible, striving to

use open source technologies, delivery platforms, and applications whenever possible, live-

streaming its meetings for the public, and working toward policy decisions through a

transparent and collaborative process. Doing so allows the network of institutions that

comprise the OERu to have the greatest reach and to transcend most commercial

considerations, as well as the unique challenges that might present themselves in each

country. This effort is borne out through the OERu's approach to meetings, which tend to

follow a consensus approach to decision-making; through the detailed and chaotic

WikiEducator website, where all meeting minutes, strategic planning, and conversations

among the leadership are posted publicly; and through the network's gradual evolution

toward a flatter, more distributed design and implementation model (Orr, Weller, &

Farrow, 2018; Udas, Partridge, & Stagg, 2016).

With this unique model, it is difficult to characterize the OERu business model as,

in fact, a business model. As Mackintosh (2016) notes, it is a term of convenience:

The OERu is a philanthropic collaboration and not a business in the commercial

sense of the word. The concept of "business model" in the context of this case

study does not refer to making a profit but to: promoting efficient practices that

minimise cost; ensuring appropriate revenue streams to sustain operations; and

widening opportunities for the social good of formal education. (Mackintosh, 2016,

p. 136)

Orr, Weller, and Farrow (2018) observe that the OERu does have a business model

nonetheless, one that has the potential to be sustainable:

The costs for hosting OERu courses are covered by a nominal membership fee

from OERu partners. In return, OERu partners derive institutional value for their

> membership: by reaching a global audience, raising brand awareness, increasing
>
> access to more diverse markets, influencing OERu planning, and better achieving
>
> community service goals. . . . Members also have the chance to gain access to
>
> world-class expertise in open-source, cloud-based technologies for cooperative
>
> design, development and delivery of open courses. (Orr et al., 2018, p. 40)

In other words, not only are there economies of scale to be had by the individual

institutions that are part of the OERu consortium, but associating with the network also

allows partners to leverage the strengths and skills of other member institutions, and can

enhance partners' reputations and extend their reach in terms of recruiting students and

crafting their own messages, in line with the community service aspect of their missions.

For example, some of the member institutions have more experience with centralized

course design, others have expertise in assessment, and still others bring a technological

fluency to bear on the project. (In addition to paying an annual fee, institutions also pledge

an amount of work to the network, equivalent to 20% of a full-time staff member's time.)

Through the collaborative nature of the OERu, each can provide support to the others and

to the network in order to facilitate the quality and efficiency of the work. In fact de

Langen (2018) has identified several other membership-partner models that operate on a

collaborative basis, noting that such organizations separate financial and operational

spheres, thus creating a two-layer business model.

      Much of the work of the OERu is coordinated by the Director of the OER

Foundation, and carried out virtually through video conference calls, email, and

collaborative work done through the WikiEducator site. However, the major progress of

the organization's goals occurs through the annual meetings of the partners and through

course development "sprints" in which teams of OERu members—course designers, librarians, assessment specialists, and subject-matter experts—work together in a compressed, focused way to kick-start the development of an open course, creating an outline and the basic content and assessments. These sprints are based on "code sprints" often deployed by open source software developers during events like hackathons (WikiEducator, 2015).

The OERu's model, business and otherwise, is based on the increasingly discussed and utilized concept of "unbundling" within postsecondary education (Hylen, 2007; Anderson & McGreal, 2012; Mackintosh, 2016; Weller, 2016; McCowan, 2017). Unbundling in this context refers to the isolation and distribution of services and programs that are typically associated with a university, usually connected either through convenience and tradition or because of their interdependence and interrelatedness. Mackintosh (2016) sees the service of a "university package" as falling into six categories (Figure 2): content services (teaching and learning materials), assessment services (formative and summative), support services (ranging from tutoring to library services to counseling), technology services, interaction services (among students, teachers, and materials), and credentialing services (including the award and maintenance of credentials). However, while teaching, research, and library services, for example, are usually "bundled" within a university, they might be unbundled with positive results in a distance learning environment, in which students may not need or want such services (Anderson & McGreal, 2012). In some cases, this might be because of cost or because those services can be obtained elsewhere with greater convenience or flexibility (Weller, 2016), but it might also be a result of demographics: adult learners, for example, might not

be interested in on-campus housing or athletic facilities, or many other services that are

valued by traditional-aged students. OERu's goal is to take advantage of the opportunities

for disaggregation of services to lower costs for learners and for institutions alike. While

unbundling of services in higher education is not without its critics (McCowan, 2017;

Weller, 2016), the OERu is focused on providing services that can be scaled across

multiple institutions with almost no marginal cost: digital copies of open materials cost

relatively little.
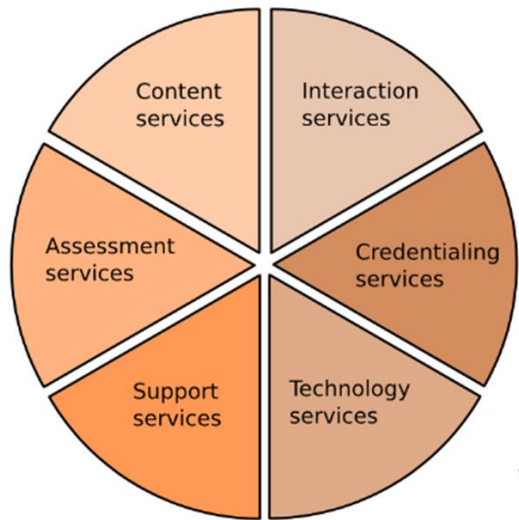
Figure 2. OERu Post-secondary educational services provided in a conventional university
package (Conrad, et al., 2014, p. 11)

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While the work of the OERu has progressed to the point where the organization has

created several one-year certificate programs that will be accepted toward degree programs

by all of the member institutions, it has nonetheless been slow. There are a number of

challenges that are being addressed. Member institutions from five continents have

multiple course development systems that do not easily align: for example, who initiates

development of a course, which approvals must be obtained before a course design is finalized, and the extent to which instructional design is centralized at each institution all have made alignment among members difficult to achieve. Even determining what a course should look like, how much content it should cover and at what level, and how long it should last has taken a series of lengthy meetings and articulation agreements to achieve (OERu, 2014).

While costs are relatively low, the OERu must continue to recruit new institutions in order to increase the scale and reach of the work. Marketing budgets are limited, and furthermore, the leadership has realized that marketing in one country or sector may not have the same effect in another country; in fact, the needs of potential learners in different countries may be very different. Acknowledging this and the other differences among institutions and their home countries' educational systems is an important art of the deliberative work of the OERu. Not recognizing these differences, in fact, could lead to a kind of "information imperialism" or neocolonialism, in which Western producers of educational resources impose, whether unwittingly or not, their interests and preferences upon those countries that ultimately remain consumers rather than producers of this knowledge (Leeds, 2013; Mulder, 2008). Lane (2012) notes that opportunities to participate in higher education in a given country are limited by several factors, including availability (do such opportunities exist?), affordability, accessibility (can opportunities be used and engaged with?), and acceptability (do such opportunities align with cultural norms and expectations, and do they have relevance in that setting?) (Lane, 2012). Several of these questions (perhaps affordability aside, unless online access is cost-prohibitive)

would also pose challenges for an organization such as OERu, as the answers certainly differ within each partner's home territory.

>*Where money was spent, and on what.* Unlike the institutions that are the basis of the preceding case studies, OERu was established by the OER Foundation to focus entirely on the creation, adaptation, and sharing of open educational resources. Thus, the organization's entire budget and business model are based on this goal; there are no competing interests. Besides basic administration expenses (maintaining a two-member staff, including the Director and an Open Source Technologist), OERu funds the development of open courses, but has also moved beyond that to a set of operational initiatives that include the creation and maintenance of an infrastructure to support the network and its curricular offerings. According to the OERu Strategic Plan, "The technology infrastructure of the OERu is based entirely on open source software generating opportunities for building a community source model whereby partners could contribute open source coding time for technology innovation and seamless integration into the local institutional delivery platforms" (OERu Strategic Plan, 2015a).

In a typical year, the OERu's budget is approximately US$200,000. About 60-72% of the budget is funded by memberships, and an additional percentage of 7.5% comes from the Commonwealth of Learning, with the rest coming from grants (OERu Strategic Plan, 2015a; W. Mackintosh, personal communication, June 13, 2018). The OERu spends about US$10,000 to $15,000 on each course it develops. Most of that money pays for the time and expertise of external instructional designers. The range in cost can be attributed to the requirements of each course: in some cases, courses can be adapted from existing resources, but in others, new content must be developed. Occasionally, materials must be

converted from closed to openly licensed. All courses, however, must be converted to a

format that will run on the open-source OERu platform. The OERu hosts courses on its

own server, and maintains a website that links to the server and manages student

registration and engagement with the courses, and several thousand dollars had to be

committed to the coding that was necessary for this open course feed. More recently, the

OERu has invested in peer learning support mechanisms, all open source, in order to

further scale the course delivery model and keep costs down for learners; the adoption of

these mechanisms has been one of the primary assignments of the Open Source

Technologist.

Comparisons to costs and revenues of other non-OER programs. The response to

this question is not comparable to the responses from other institutions because the OERu

has no non-OER programs with which to compare its OER programs. However, the

Director's response to this question was illuminating. OERu has done an analysis

comparing the average cost of tuition in the United States to the cost of acquiring an

OERu-supported credential: whereas in the US, it would cost approximately $594 per

credit hour, plus textbooks (which on average cost $40/credit hour), the equivalent courses

would cost $83 per credit for an OERu certificate, without textbook fees (OERu, "Strategic

Plan 2018-2021," 2018b). This is possible because of the OERu's unbundled model, which

avoids the cost of many support services provided by a typical university, but also because

of the low costs of adapting existing OER materials and the contributed staff time from

each of the member institutions. (For purposes of comparison, Institution C spends at least

twice the amount for each of its new courses that OERu spends.) While this comparison

does omit many of the "bundled" services associated with a university, and to a large

extent depends upon the existence of these institutions as a support for the OERu (60% of the OERu's funding is derived from member institutions, with the rest coming from philanthropic sources), it does indicate that a lower-cost business model is possible through a consortium model along these lines.

Changes over time, if known. Over the past five years, the OERu has shifted its focus. Initially its concern was primarily the development and, more likely, the adaptation of individual open courses, and it did so by accepting nearly any course provided or identified by an individual partner. Gradually, as other organizations and institutions began to create more OER and the field matured, the OERu network was able to identify resources that they determined to be of better quality and better aligned with the emerging goals of the OERu. Those goals now concern the creation of a full curriculum, putting together courses in a sequence that lead to university-level credentials, rather than developing individual courses. OERu has built on this goal gradually, first creating micro-courses that could be modularized to provide more flexibility and better suit the differing requirements of its international partners, and then moving onto microcredentials: smaller, more focused certifications of knowledge or skills, which are "stackable" building blocks that can be combined into larger credentials such as certificates and degrees. Working with Otago Polytechnic, OERu has now established a microcredentialing program called Edubits. Beyond that, ultimately, OERu's goal has been to offer entire certificate programs, each consisting of a year's worth of full-time study, and to have those certificates accepted by the partner institutions toward a degree. Now, as of 2018, there are at least two such certificate programs, each offered by one of the partner institutions.

Perhaps surprisingly, maintaining and promoting partner engagement continues to be a challenge, as many partners do not actively contribute to the work of the organization, either lacking the expertise or not seeing the return on investment or the overall value proposition of collaboration in such a network (OERu, "18.11 Partners' Meeting Report," 2018c). Some simply are unable to spare the time or resources, but a larger problem appears to be the entirely open and voluntary nature of the collaborative work of the OERu. This is attributable to the classic collective action problem, which is frequently cited in sociological studies (Hardin, 1982; Olson, 2009; Willer, 2009): individuals motivated by self-interest (and, by extension, their commitment to the interests of their own institution) might often find that, because of limited resources and time, this self-interest can be at odds with the interests of the voluntary association to which they belong—in this case the OERu, though this is more often noted in such areas as environmental action (Hardin, 1982) and voting (Ostrom, 2010). While sociologists and political theorists have suggested solutions to the collective action problem, there is as yet no agreed-upon solution to striking the right balance between self-interest and contributions to a group with a larger purpose. This is true as well for the OERu, despite the demonstrated commitment of the partner institutions and their representatives.

Commonalities across Institutions

The only factor that was originally considered in including Institutions A-D as case studies was the fact that each utilizes OER in their curriculum. Nonetheless, they have other characteristics in common, and there are patterns among their programs and the approach each took to OER. Perhaps not surprisingly, all of the institutions have a publicly stated commitment (upon which they endeavor to act regularly) to expanding access to

education. In addition, all are publicly funded, with limited budgets of their own. This may

be speculative, but it is possible that the combination of these two factors—commitment to

expanded access, and limited funding—might be crucial in leading an institution to adopt a

policy toward OER: such institutions continually experience for themselves a "macro"

version of the challenges their own students face. Perhaps such a dynamic is an influence

in leading these institutions to OER (Carson et al., 2012; Lane, 2012). It should be pointed

out that such institutions comprise only one of the two categories of universities engaged

in OER production: the other category consists of universities that have utilized OER for

the purposes of gaining positive publicity or positioning those institutions as leaders and

innovators, as in the case of MIT or Yale (Carson et al., 2012; Phelan, 2012; Walsh, 2011).

Besides these two factors, there were a small number of additional, important

commonalities among the institutions: none of these institutions initially created a business

model or plan for their OER initiatives, nor did any give serious consideration to financial

tracking, at least at the outset of these programs. Institution A, for example, has a unique

relationship with its faculty members, but did not initially consider the impact of this

program on its faculty, particularly in term of the amount of time they would need to make

their contributions. As a result, there was some initial resistance to the project on the part

of the faculty, and the administration needed to respond to their concerns. Ultimately, most

of the expenses involved in creating their OER program involved faculty release time or

outright subsidies to faculty members to encourage them to contribute to the project. While

the other institutions did not experience exactly this problem (in fact, Institution D's

leaders handled this same question of faculty involvement by making clear that the work of

OER development was to be done by full-time faculty members and academic staff on top

of any existing responsibilities they had, though contract and adjunct faculty member were

paid for their time reviewing and identifying open resource), they did not typically

consider the need to create a business plan or project plan for OER initiatives. In some

cases, this was because the institution's commitment to its mission of expanding access

outweighed cost concerns; nonetheless, costs were not tracked or compared, at least in

initial stages. Institution C, as an example, began its OER program on an ad hoc basis,

lumping all low-cost or free options together, and made no distinctions between courses

created using open resources and those that were not. Thus, it did not track costs. In fact,

Institution C only recently completed an audit of their courses to determine which courses

use OER, and to what extent.

 The implications of these common factors will be discussed in the next chapter.

Chapter 5. Discussion and Analysis

Because this is a research project based on multiple case studies, it is difficult to summarize any findings as applicable to other institutions at other times and regions, let alone those in Canada and the United States at the present time. Nonetheless, there are some common characteristics and patterns among the OER initiatives at these institutions that are worth noting, as discussed briefly at the conclusion of Chapter 4. Stake (1995) notes that certain generalizations can be made with case studies, if only on a smaller scale or to modify existing grand generalizations. Nonetheless, it is also important, as Stake asserts, to keep in mind "that it is the case we are trying to understand. . . . We are trying to understand behavior, issues, and contexts with regard to our particular case" (Stake, 1995, p. 78). For this study, the data gathered from these few cases can suggest an answer to the question concerning sustainable business models for institutions of higher education. Because each institution finds itself in a different context, facing different issues, and managed by and answering to different kinds of people (and attended by different kinds of students), there is no single approach to financial and mission sustainability that could likely be determined through a systematic study of institutions of any sort. Nonetheless, there are patterns identified that could suggest a way forward.

This chapter, then, will first present a summary of the results of the case studies described in Chapter 4. Next, it will consider whether the analysis of these case studies has the potential to answer the research question driving this study:

Can the cost of OER to an institution be justified if the result enables the institution to achieve its mission more effectively than it would if it utilized commercial materials?

Following this, how this study relates to the previous studies addressed in Chapter 2 will be considered. Next, in order to address some of the challenges that faced these institutions (specifically, Institutions A through D), the chapter will discuss the approaches to business model generation described by Osterwalder and Pigneur (2010) and others, and how those might be relevant to future OER projects. Finally, the implications of this study and some possible directions for future research will be discussed.

Analysis of the case studies

To get right to the heart of the matter: with one exception, none of the institutions that were the subjects of these case studies had attempted to directly compare the costs (to themselves) of utilizing OER to those associated with the use of commercial materials. The one institution that did compare costs in any way—Institution B—did so because its business model involves partnering or contracting with other institutions and agencies to develop relevant programs and curricula. Institution B's ability to lower cost of instruction through the use of OER has been a competitive advantage for its partners to whom it provides course materials and training programs; several partners saw enrollments increase when textbook prices were reduced to zero. OERu has no basis for comparison of its own costs to those of commercial models, as it did not previously create materials using commercial means. Instead it positions itself as providing an alternative to an institution's own curriculum and program development, making the case that an unbundled approach to the creation of course materials is in fact more cost-effective (Anderson & McGreal, 2012; Mackintosh, 2016). While it does appear that OERu can develop courses at a lower cost than most universities in Canada and the United States can on their own, OERu's unbundled model omits all of the supporting functions of a university that many

institutions must factor in to their overall expenditures (Desrochers & Staisloff, 2018).

Mackintosh (2016) notes that, among other factors, universities carry certain fixed capital

costs that are not affected by the fluctuating number of course registrations from term to

term, whereas those institutions could draw upon outside course materials such as those

created by the OERu without incurring any long-term obligations. In addition, the digital

format of OERu materials reduces long-term production costs, as "the marginal cost of

replicating digital knowledge is near zero" (Mackintosh, 2016, p. 138). Most universities

also use non-digital materials, again making a direct comparison between the OERu's costs

for course development and those of a postsecondary institution difficult to make. While

all of the institutions in this study have extensive online course offerings, they also offer

non-digital, face-to-face instruction for thousands of students.

All of the institutions in this study received external grant funding for their OER

programs at some intermediate stage of program development, though these grants were

not received at the outset of the initiatives. In other words, in no case did an institution

launch an OER initiative because of a grant. The two Canadian institutions have shared in

or directly received grants from their provincial consortium for distance learning and

technology, while the two US institutions received grants initially from large philanthropic

foundations, and then more recently have been granted funds from their state legislatures.

OERu has been funded by several foundations, and is primarily supported through partner

fees. Each of the institutions indicated that, while external funding did play some role in

their OER programs, the programs existed prior to the availability of such funding, and

would have continued on in some form without such funding. For example, Institution C's

Director of Digital Education Strategies noted that without external grant funding, the

institution's OER efforts would have focused more on adoption and adaptation of existing

OER less on the creation of new materials. Likewise, Institution B's Director of the Centre

responsible for OER initiatives made clear that the institution had had a dedicated budget

line for OER for at least six years: while external grants had been helpful, they had not

been critical to the project's sustainability.

In line with this initial "homegrown" approach to OER development,

representatives of three of the four institutions noted that their OER programs were

created, and initially sustained, by simply reallocating existing resources. Institution A

reallocated some money from teaching to OER curation; Institution C, which had always

utilized a centralized curriculum development process, simply changed its approach from

identifying commercial materials to researching open ones; and Institution B simply

"leveraged one thing to do another"—building on existing systems and processes to

incorporate OER. These examples provide the beginnings, if only anecdotally, of at least a

partial answer to the specific question of whether OER materials cost more than

commercial materials. In these cases, the openly-licensed materials did not cost these

institutions significantly more.

However, there is no set dollar amount or percentage that can be asserted as the

difference in cost: as each institution handled its financing differently, established different

goals and methods for its use of OER, and tracked expenses differently (and frequently,

not at all), no formula for determining the costs of OER is readily available. As Soares,

Steele, and Wayt (2016) observed, public systems in the US have different methods of

collecting financial data; in keeping with their different approaches, measurement of

financial accountability varies from state to state. Variability among institutions might be

even greater in Canada, where the provinces utilize different funding models for

postsecondary education, and institutions employ wide-ranging methods of data gathering,

not to mention variable responsiveness to provincial efforts to enforce some kind of

accountability among institutions (Diaz Paniagua, 2014; Usher & Pelletier, 2017). As a

result, some institutions measure only direct costs of operations in each academic unit,

while others will employ a form of activity-based costing, which does a better job of taking

into account fixed overhead and administrative costs, but not revenues. Institutions in

Canada and internationally use some version of this approach (Miller, McAdam, &

McAdam, 2014; Usher & Pelletier, 2017; Zott & Amit, 2010), or an approach known as

responsibility-centered budgeting (RCB), which includes activity-based accounting but

also incentivizes cost containment and accountability within each academic unit. The intent

of RCB and activity-based costing is to allocate the costs of a campus service, such as

library services, to those units that use the service, rather than distributing the costs of an

activity equally across an institution regardless of whether it is used by all equally. This

approach is utilized, at least in part, by dozens of large institutions in the US and Canada

(Deering & Lang, 2015). RCB and responsibility center management have been criticized

for decentralizing cost accounting, rewarding high-revenue units at the expense of units

with lower usage, and forcing comparisons between units that may justifiably have

different approaches and needs in spending money, such as when student profiles differ

(adult learners versus traditional-aged students, or disability services, for example), but

they can also allow for such differences among academic units and lead to a more

evidenced-based approach to spending on diverse types of learners and the programs that

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can help them succeed (Soares et al., 2016). Unfortunately, this variety of methods makes comparison or costs and revenues even more difficult.

Just as importantly, however, all of the institutions studied saw the "cost" of OER as more complex than simple revenues and expenditures, as needing to be measured and expressed in more than strictly financial terms. All described the importance of lowering costs for students and increasing access, rather than being focused on generating direct revenues. The Vice President at Institution A, for example, noted that the expenses of adapting and creating OER might appear as an increase in expenditures on the institution's income statement, but are actually simply costs that have been reassigned from the student to the institution. He also expressed the hope, following the institution's general intuition, that the revenue would come back to the institution through improved enrollment retention rates, as some have posited (Annand & Jensen, 2017; Butcher & Hoosen, 2012). In fact, engagement rates (as measured by the amount of time students log in to online courses) and completion rates for students enrolled in OER-based courses have improved slightly, as noted in Chapter 4. This is occurring against the backdrop of the fact that enrollment at Institution A has been declining each year since 2012, which is consistent with the overall trend for enrollments at institutions in the United States, though in Canada postsecondary enrollments have been more or less flat over that period (National Student Clearinghouse, 2018; Statistics Canada, 2019). Similarly, the other institutions in this study consistently acknowledged that the primary motivation for incorporating OER was not their own cost savings, but those of students. On the other hand, few institutions can afford to spend unlimited amounts of money to achieve their goals for expanding educational access.

The case of the OERu is different from the others, as noted previously, because it operates as a non-profit partnership that provides an alternative pathway to a credential, and does not need to manage the other costs that are involved in operating a postsecondary institution. It functions as a service for postsecondary institutions, the learners themselves, and the greater social good, but also as an advocate for open learning. While the mission of OERu is similar to the stated missions of most of these institutions in its emphasis on public service and the expansion of access to education, it nonetheless depends on revenues generated primarily from fees paid by its partners and philanthropic contributions. As such, it has emphasized a full accounting of its costs from the very beginning of its existence in 2011. Expenses have hovered around US$200,000 every year since 2011, and revenues have averaged slightly more than that. OERu has contemplated raising additional revenue through a number of "value-added" services, such as fees for microcredentialing and professional development certifications, or possibly for tutorial support services (OERu, 2018d).

Even though the output of the OERu consortium in terms of courses developed has expanded in recent years, some costs have been reduced as the number of open source options for technological support has increased, and as partners have streamlined their operations and processes for developing digital courses and for collaborating. For example, Lane (2018), the Open Source Technologist for OERu, notes that OERu's reliance on open source systems and software has led to significant cost savings. He provides a breakdown of technology-related expenses, including computing infrastructure, communications tools, analytics programs, the course delivery platform, and other applications, which add up to an annual cost for software and infrastructure of US$4,800. As Lane points out, "if any of

our partners adopted even one of the technologies we have incorporated into our [digital

learning environment], they could easily save many times the value of their annual OERu

subscription fees in the first year, and in every subsequent year" (Lane, 2018, n.p.). This

indicates that, at least as far as the use of technology to develop and manage OER is

concerned, open source software does not cost more than commercial software does,

though the research and time commitment that went into identifying and gradually

adopting these technologies were considerable in past years, as compared with the

adoption of an off-the-shelf technology.

A deeper, more direct comparison of OERu's course development costs to those of

the institutions included in this study is not possible, since several of the institutions have

not tracked costs for OER-specific courses, nor for courses developed using commercial

materials. However, Institution C has begun to budget for development on a course-by-

course basis. Institution C's courses are centrally designed by its team of instructional

designers, in digital and face-to-face formats. Its determination has been that there is no

significant difference in the cost of developing courses whether they are using OER or

commercial materials: courses typically cost approximately CDN$30,000 to develop,

particularly when existing OER can be adapted for use in a course. By contrast, when new

OER must be created, costs are considerably higher. In 2018, five courses developed all in

a single subject area—digital accessibility—had a total budget of CDN$280,000, as noted

in the previous chapter. OERu, on the other hand, budgets approximately US$10,000 to

$15,000 per course. Again, OERu's model is an unbundled one, so it does not carry the

overhead costs that Institution C and the others must carry. Institution C, for example,

includes the cost of instructor fees for piloting these new courses in its overall budget for

each course, whereas OERu leaves piloting, if it is done, to the partner institutions, which

may absorb such costs. Nonetheless, even removing the cost of instruction, which one

might estimate to be a few thousand dollars, varying by institution, the reliance by OERu

on open source materials and technology in almost every respect does seem to lower costs

overall.

Does this analysis address the research question?

Based on the foregoing discussion, this analysis does begin to address the research

question, at least in a limited sense. Certainly the narrower wording of the third subsidiary

question—"is free more expensive than commercial?"—can be addressed by this research.

Initial costs indeed are often higher as a new model for course development is

implemented, and in fact would even be higher than measured and reported, as many

participants in such projects contribute more time than that for which they are formally

compensated (Griffiths et al., 2018). The acquisition and implementation of new

technological systems such as repositories and delivery platforms, new approaches to

identifying and creating materials that require more active intervention (as opposed to, say,

waiting for the textbook salesperson to arrive on campus to present their commercial

options), additional review cycles often involving multiple faculty and staff members,

different approaches to marketing, and initial effects on bookstore sales, all can add to

startup costs and commitments for a new OER initiative. As noted previously, Griffiths, et

al. (2018) determined that development of an OER course cost, on average, US$11,700,

entailing approximately 172 hours of labor, including time spent identifying resources,

creating or revising content, and setting up courses, as well as engaging in administrative

work, technology-related activities, and other course-related work. However, that study,

thorough as it is, does not provide a comparison to the cost or amount of time needed for a

non-OER course, as many of those costs and hours for the commercial equivalents are not

first-time costs. In other words, many of the OER projects included in the study involved

staff and faculty who had not worked with OER before, so the amount of time their

projects took was longer as they familiarized themselves with the concepts and approach.

In contrast, the time spent on developing courses based on commercial textbooks and

resources can be less because rigorous curation and evaluation of those resources is less

likely, having been outsourced to the commercial publishers (Wiley, Williams, DeMarte,

& Hilton, 2016).

If one considers only the financial outlays of the institution itself, OER might

appear to cost more than commercial materials in some circumstances, especially in the

short run (Cusumano, 2016; Desrochers & Staisloff, 2018). However, as the institutions

themselves would assert, this narrow view would then leave aside the effects of the use of

OER on classroom activity and pedagogy, enrollment, and course completion, which are

crucial considerations (and indirectly may contribute to revenues) for an institution's

overall business model, as opposed to what might be reflected in its financial statements.

Even so, at least in the cases of Institutions B and C, over time, institutional costs appear to

be either lowered using OER, or were the same as they were using commercial materials.

Furthermore, Institution A's overall budget for course and curriculum development has not

changed since the implementation of OER across its curriculum, so administrators there

believe that the use of OER has not been an added burden for the institution itself.

Additionally, the effects of collaboration among institutions to develop or adapt OER have

also lowered institutional expenditures, as costs can be distributed across the network of

collaborating institutions (Orr et al., 2018). This is true in the cases of Institution A, which

is part of a statewide consortium as well as a network of community colleges, and

Institution D, which has been actively involved in collaborative networks in its own state

and a multi-state effort as well. This focus on direct expenditures does not consider the

additional academic and pedagogical benefits of such collaborative projects. Nonetheless,

the fact that costs are equivalent if not lower for OER indirectly answers the primary

research question: if the cost is not higher, it can certainly be justified, as long as the

institution's goals are not hindered by the use of OER, which has not been shown to be the

case in any instance.

     The answer to the broader question, then, as to whether the cost of OER is "worth

it" if it helps the institution achieve its mission, is that it is, because the cost of OER does

not exceed the cost of a traditional commercially based model, at least over the longer

term. OER did not carry higher costs for these institutions, at least, suggesting that this

result would be possible at other institutions in Canada and the United States. Taking this

farther, though, it is important also to consider the notion of opportunity costs as it might

relate to this context. Opportunity costs are the value (or cost) of the option chosen, minus

the value or cost of the option not chosen. One might expect that when one chooses to

create educational materials using OER, there is an opportunity cost, which represents the

difference in value between OER usage and commercial usage. In determining the

opportunity cost of utilizing OER, one would compare the cost of production using OER to

the cost of production using commercial materials, or putting it another way, to making no

change to one's usual manner of curricular development. This static model would assume

that nothing else is changing in one's environment or market. However, in a rapidly

changing, competitive market in which other institutions are implementing changes to their

curricular models, opportunity cost decreases, because keeping the status quo becomes

more costly as others introduce innovations (Holmes, Levine, & Schmitz, 2012). In other

words, doing nothing becomes more and more costly as others adopt new approaches, and

in fact, the cost of catching up later gets higher and higher as time goes on. This

comparison is more difficult to measure, but anecdotally, US institutions that have

traditionally seen themselves as peer institutions of Institution D, a large, public state-

funded open university, have declined in enrollments while Institution D was the only one

among its peers to increase the number of students enrolled in courses (S. Adams, personal

communication, June 8, 2018; T. Goodyear, personal communication, June 8, 2018).

Relationship to Previous Studies

As noted in Chapter 2, a systematic analysis of this type, comparing the costs of

OER to those of commercial educational resources, has not previously been done. This is

partly because the emergence of OER is relatively recent, as is the emphasis on developing

a sustainable business model for postsecondary education. The absence of any literature on

business models for higher education until the last decade or two, the lack of clarity

regarding the definition of a business model (Lichy & Enstroem, 2015; Miller et al., 2014),

and the relatively recent change in funding models for institutions in the US, Canada, and

worldwide (Longden & Bélanger, 2013; Newfield, 2016; Quinterno, 2012; Soares et al.,

2016; Winslow, 2015) have all made this kind of study difficult to execute, as well as

relatively unrewarding in terms of practical, actionable findings (Lang, 2017; Soares et al.,

2016).

In previous studies, it has been easier and more common to demonstrate the cost savings for students realized via OER (Colvard et al., 2018; de los Arcos, Farrow, Perryman, Pitt, & Weller, 2014; Desrochers & Staisloff, 2018; Fischer, Hilton, Robinson, & Wiley, 2015; Griffiths et al., 2018; Hilton et al., 2014; Wiley et al., 2016), as well as the educational benefits that derive, at least in part, from the use of open materials (Colvard et al., 2018; Fischer et al., 2015; Hilton et al., 2016). However, most studies that posit a cost saving for institutions through the use of OER (Meyer, Bruwelheide, & Poulin, 2009; Orr et al., 2018) have not offered evidence to support this assertion, or provide limited or inconclusive evidence at best (Griffiths et al., 2018; Hollands & Tirthali, 2014). While the results of this case-study project are not generalizable, in that they cannot be assumed to be valid when applied to other institutions, these results are unique in demonstrating some cost efficiencies at the institutions under review.

Where some previous work in this area has laid the groundwork for the results of this study is in their evaluation not only of the direct costs of OER, but also the revenues and other benefits that are derived indirectly as a result of expenditures on OER. These benefits contribute to the achievement of institutional mission. Cusumano (2016) lists "faculty research, curriculum development, marketing and sales, infrastructure overhead, quality control and administration" as among the many expenses associated with creating, delivering and maintaining open content (Cusumano, 2016, p. 106), though he does not actually analyze the extent of these expenses. In addition, this accounting overlooks the fact that if an institution uses OER created by others, it does not necessarily take on a commitment to maintain the material: it only needs to ensure, as many institutions already do, that the materials remain relevant to its curriculum, just as it would with commercial

textbooks (Wang & Wang, 2017; Bernstein, 2014; de Langen, 2013; Olcott, 2012b). Olcott (2012b) describes the need not just to create OER in such a program, but to continue to maintain repositories of OER materials, oversee quality measures, and ensure an ongoing investment in OER programs. Griffiths, et al. (2018) included many of those same expenses in their evaluation of costs of OER incurred by five US community colleges, all of which were participants in a grant program. Their analysis also took into account and calculated the costs of faculty release time, in which faculty members would teach fewer courses so that they could spend more time identifying and/or creating OER materials. In addition, Griffiths, et al., noted the gap between the cost of this faculty release time and the actual number of hours spent on content development, showing that in some cases, faculty and staff spent their own time on these projects, exceeding the number of hours that had been budgeted. However, this study did not include a comparable measure of the cost of developing commercially-based materials (Desrochers & Staisloff, 2018; Griffiths et al., 2018). Thus, the question of whether OER costs more than commercial materials was not addressed.

This difficulty in obtaining information that would allow researchers to compare the costs associated with OER to those associated with commercial materials is a challenge that is common to a number of the academic studies not only of OER, but also of online and distance education. Bryan, Leeds and Wiley (2018) attempted to measure the cost-effectiveness of online courses developed and offered through the University System of Georgia; they determined that it costs the system US$43 per credit hour to deliver online courses, but they could not come up with an equivalent figure for delivery of face-to-face learning. Such information was fiercely protected by those responsible for such spending,

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and obtaining access to it became a political issue that was not easily resolved (C. Bryan,

personal communication, July 19, 2018). This is consistent with other efforts to analyze the

costs of implementing online learning programs (Katz, 2016). While there are several paths

to the development of a sustainable business model that includes online learning, the lack

of data or a comprehensive understanding of revenues and expenditures make it difficult to

verify sustainability. For example, many administrators of online programs report that

online content and instruction carry greater expense to the institution than classroom-based

courses, even while also claiming that online programs are net revenue generators to their

institutions (Legon & Garrett, 2017). Both can certainly be true, if, for example, the

presence of online programs generates benefits in other related areas (such as lower costs

for maintenance and construction of physical classroom spaces), but current research does

not seem to consider the totality of the business model beyond direct costs and revenues. In

addition, such institutional efforts involving implementation of online learning often have

attracted short-term funding, such as through grants, but lacked a longer-term plan for

continued funding to allow for the establishment of, and evaluation of, the viability of such

programs over a longer period of time (Casanova & Price, 2018).

Those studies that do evaluate the effectiveness of institutional business models

tend to overlook the question of institutional mission. Postsecondary institutions exist

primarily to fulfill educational missions; how effective they are in fulfilling those

missions—particularly, how effective they are at improving the lives of those they serve—

must be taken into account when one considers their financial sustainability (Soares et al.,

2016). Gibb, Haskins, and Robertson (2009) suggest that questions of finance are often

oppositional to questions of mission. In their view, mission, values and culture are the

primary motivating forces within any organization, and evolving funding models have the

capacity to impinge on institutional mission and autonomy—though they do not need to.

Lane (2012), in fact, notes that OER can help to support and amplify the institutional

missions whose goals include the expansion of access. Stacey (2012) identifies ten ways

that OER initiatives can support the missions of educational institutions:

- increase access to education

- provide students with an opportunity to assess and plan their education
  choices

- showcase an institution's intellectual outputs, promote its profile, and attract
  students

- convert students exploring options into fee-paying enrollments

- accelerate learning by providing educational resources for just-in-time,
  direct, informal use by both students and self-directed learners

- add value to knowledge production

- reduce faculty preparation time

- generate cost savings

- enhance quality

- generate innovation through collaboration (Stacey, 2012, n.p.).

Stacey sees the "business case" for OER as providing both direct and indirect

benefits in the form of revenues and cost savings. Granted, the fulfillment of institutional

mission is difficult to measure, as no metric yet exists to assign a financial value to a

university's expansion of access to those who might not otherwise be able to earn a

university credential. Blank (2016) says that, "Mission achievement is the value you are

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creating for the sum of all of the beneficiaries/the greater good," but he does not suggest a

means of measuring this achievement, noting only that it cannot be measured in dollars and

cents (Blank, 2016, n.p.). While most of the institutions in this study include the expansion

of access as part of their missions, none have specified a quantifiable goal in this regard.

Nor have any set a specific target in terms of their own revenues or expenses when it

comes to the use of OER.

Business Model Generation for OER

One way to address some of the challenges of evaluating the costs and benefits of

OER, particularly as they relate to the creation of sustainable business models, is to

consider the Business Model Canvas approach described by Osterwalder and Pigneur in

their book, *Business Model Generation* (2010). Such an approach has been linked both to

complexity theory (Fitzgerald, 2016; Foss & Saebi, 2016; Massa, Viscusi, & Tucci, 2018),

in that the Business Model Canvas considers the interplay of several interdependent

subsystems, centered on activities, some congruent and others operating at cross-purposes;

and to contingency theory, which suggests in this context that business models are

dependent on the unique circumstances and situation in which the organization intends to

operate (Fiedler, 1964; Foss & Saebi, 2016). Ironically, the Business Model Canvas has

been both criticized and praised for attempting to simplify, or perhaps oversimplify, a

complex system (Fitzgerald, 2016; Foss & Saebi, 2016).

Certainly, one limitation to this approach in this context is that it was intended to

articulate a business model for a whole system or organization; in that sense, it is an

effective tool for an organization such as OERu. However, for a postsecondary institution

with several competing, overlapping, even contradictory missions and business models, not

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to mention the historical absence of business model thinking in higher education (Dyer, 1970; Ghaziani & Ventresca, 2005; Miller et al., 2014), the Business Model Canvas used in this context will serve only to illustrate a possible business model for a narrow segment of the institution's operations. In fact, many institutions that are ordinarily considered nonprofit are hybrid entities, operating spinoff for-profit subsidiaries to generate funding for the nonprofit segments or because the for-profit venture proved incompatible with the overall mission (Smith, 2014). Perhaps, as with the OERu, an Open Business Model might eventually be extended to other areas of the university, but how this might be applied to, say, physical plant operations is beyond the scope of this study.

For Osterwalder and Pigneur, "a business model can best be described through nine basic building blocks that show the logic of how a company intends to make money" (Osterwalder & Pigneur, 2010, p. 15). These building blocks (Figure 3) are as follows:

1. Customer segments

2. Value Propositions

3. Channels—how value propositions are delivered and/or communicated

4. Customer Relationships

5. Revenue Streams

6. Key Resources

7. Key Activities

8. Key Partnerships

9. Cost Structure
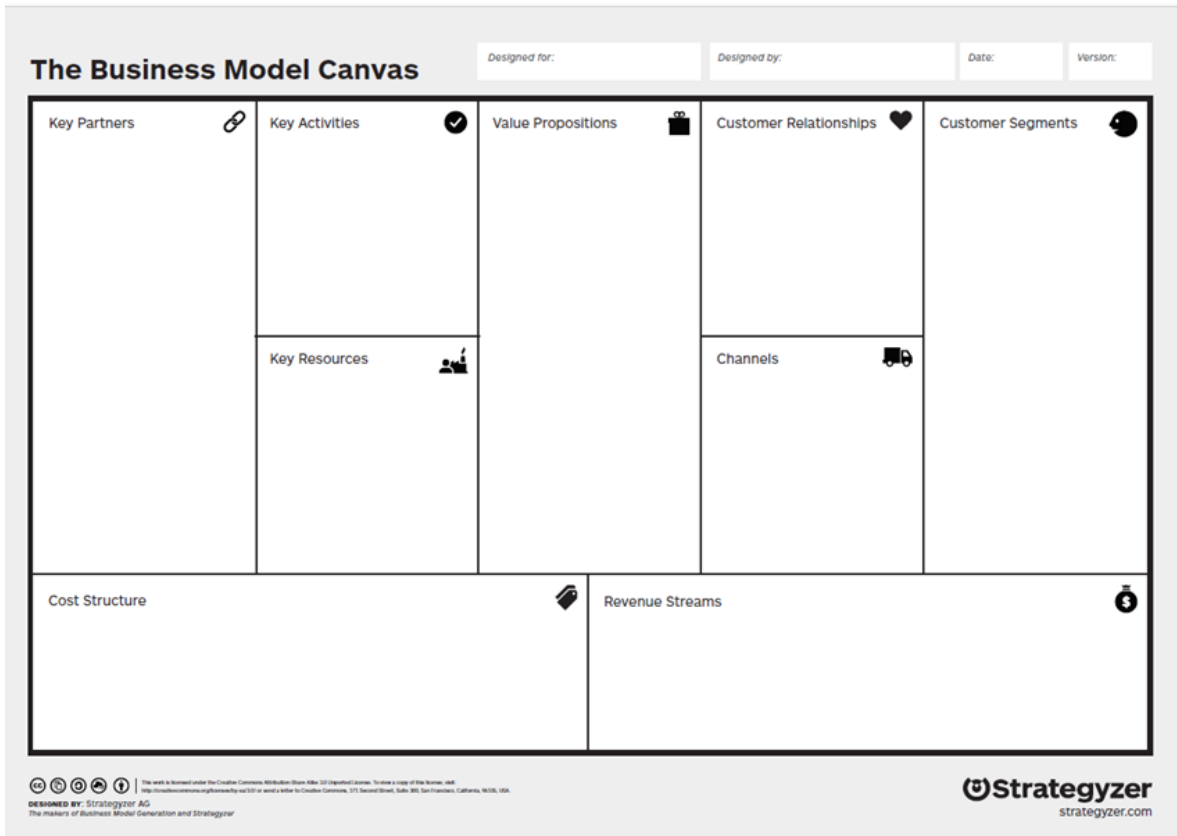
Figure 3. Business Model Canvas (Osterwalder & Pigneur, 2010). Accessed at
https://assets.strategyzer.com/assets/resources/the-business-model-canvas.pdf.

This approach is typically used by for-profit businesses (Foss & Saebi, 2016),

though Helsdingen, Jansen, and Schuwer (2010) have applied it to OER using a

contingency model approach, acknowledging that the business model canvas was not a

perfect fit for the OER programs they considered, and noting as well that the institutions to

which they applied this model were not entirely successful in achieving their goals by a

number of measures, measures which were themselves limited or not well thought out.

However, this model has been refined since its original publication in 2010 to include a

Value Proposition Canvas and a Mission Model Canvas for those organizations "whose

primary goal is not to earn money, but to fulfill a mission" (Blank, 2016). While this is not

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a prescription for success for any of the institutions included in this study, the Business

Model Canvas in its modified version can provide institutions with a language and a

template for considering their goals and ensuring that they have considered the various

aspects considerations that must go into developing a sustainable business model.

In the modified Mission Model Canvas, which is more relevant to the institutions

studied in this project, some of these building blocks are modified to reflect the focus on

mission rather than profits. Thus, the revised building blocks are as follows, with the

changed elements in bold:

1. **Beneficiaries**

2. Value Propositions

3. **Deployment**—depending on how successful deployment is defined, and

how widespread deployment is expected to be

4. **Buy-in/Support**

5. **Mission Achievement**

6. Key Resources

7. Key Activities

8. Key Partnerships

9. **Mission Cost/Budget**

To elaborate on the rationale behind a few of the changes: Customer Segments

become Beneficiaries because not everyone who benefits from the work of a nonprofit

institution is a customer. As noted in Chapter One, the public as a whole can derive

benefits from the end products of a university, whether through teaching or research, in the

form of enhanced general well-being, increased tax revenues, reduced health care

expenses, longer life expectancy, and a more informed citizenry (Doyle & Skinner, 2017; Koropeckyj, Lafakis, & Ozimek, 2017; McMahon, 2006, 2015, 2016). Channels become Deployment, since in the Mission Model approach, getting your work into use by potential beneficiaries (students and other stakeholders) is more important than distributing it to "customers"—which in this case would be the university. Likewise, the concept represented in the original model by Customer Relationships is more accurately expressed here as Buy-in/Support: rather than being concerned with growing and maintaining a customer base, those using the Mission Model would look to promote buy-in among all beneficiaries, not only those who actively engage in transactions with the business (Blank, 2016).

The idea of "Revenue Streams" makes less sense as a primary goal in a non-profit setting, though they are not completely meaningless for a university that is dependent on outside funding and tuition dollars to sustain its mission. However, replacing this emphasis with a focus on mission achievement is more appropriate, as any university that generates revenue at the expense of fulfilling its mission is doing something wrong. As Blank (2016) notes, "There is only mission achievement if it delivers value to the end beneficiary" (Blank, 2016, n.p.). Finally, the measure "Mission Cost/Budget" replaces "Cost Structure." Mission Cost/Budget refers to "the most important costs incurred while operating under a particular business model. Creating and delivering value, maintaining customer relationships, and generating revenue all incur costs" (Osterwalder & Pigneur, 2010, p. 40). Again, in a mission-driven business model, the metric of success is mission achievement, not revenue, so any cost expended that does not go toward achieving the mission would not be relevant. Certainly, some universities do have such costs: for

example, certain amenities for students, the most extreme example being the notorious

"lazy river" recreational waterways that Texas Tech University, Louisiana State

University, and several others built in the last decade or two (Stripling, 2017), might

qualify as not relevant to the institutions' core mission.

These revisions to the Business Model Canvas are particularly relevant for

postsecondary institutions and their use of OER. After all, these institutions are not trying

to make money as an end in itself; rather, they are trying to create value for their multiple

stakeholders, or beneficiaries. In fact, the question in this case is whether using OER will

carry costs that exceed those of traditional models, allowing institutions to fulfill their

missions, not whether it will generate more revenues.

In fact, OERu has itself utilized its own adapted version of Osterwalder and

Pigneur's Business Model Canvas, though the OERu Business Model Canvas (Figure 4)

was initially created in 2015, prior to the Canvas being updated for mission-driven

organizations by Osterwalder and Blank (Blank, 2016). This Canvas is intended not only

for the OERu and the OER Foundation's own business model, but also to assist partner

institutions with conceptualizing their own OER-based business models, so that they might

be able to articulate a rationale for collaborating with the OERu network. Rather than

changing the original categories, the OERu Business Model Canvas keeps all nine, but also

adds two new categories: Social Good and Creative Commons Licenses (OERu, Business

Model Canvas, 2015b). The Social Good category is concerned with the question, "Beyond

revenue and profits what social good is generated by this business?" (OERu, 2015c). In

this way, the new category is similar to the Mission Achievement category in the Mission

Model Canvas. The Creative Commons Licenses section is less a category of the business

model and more of a brief introduction of the various Creative Commons licenses and how they work: the various licenses are listed, with an explanation that makes clear that "Creative Commons licenses are not an alternative to copyright. They work alongside copyright and enable you to modify your copyright terms to best suit your needs" (OERu, Business Model Canvas, 2015b). This section functions as more of a selling point to the institutional partners of OERu, who can use this language to explain the value proposition of the consortium to others, and to build their own open business models. Indeed, four partners did create their own open business models patterned along these lines (OERu, 2015d).

Overall Open Environment Business Context

The OERu is a philanthropic collaboration widening access to affordable education using OER with pathways to achieve formal academic credit from our partners. The OERu is contributing to nurturing the development of sustainable and scalable ecosystems for open education on a global scale.

Key Partners

Existing partners
- OERu Partner institutions
- OER Foundation
- UNESCO/COL and ICDE OER Chair network
- Donor organisations and corporate citizenship

Potential partners to be engaged
- Politicians/government officials responsible for funding higher education, who are increasingly aware of the lack of fiscal sustainability of existing systems.

Key suppliers
- All OERu Partners
- OER Foundation
- Open source software projects
- OER and open textbook projects

Resources acquired from partners
Courseware; Assessment and credentialling services; Open source technology infrastructure and associated expertise.

Motivations for Partnerships
Access to and acquisition of open source expertise; Cost-effective sharing of courseware design, development and delivery activities; Low cost and low risk innovation; Cooperative development of innovative open pedagogies; Development and implementation of new business models.

Key Activities

Core activities
- Open course design and development
- Open planning for implementation of the OERu
- Sharing of technological and pedagogical expertise
- Open peer review
- Assessment services

Value added activities
- Joint delivery of courses
- Shared professional academic development for open design

Key Resources

Core resources
- OER and open access materials used to assemble OERu courses
- Open source software technology infrastructure provided by the OER Foundation

Human resources
- Subject matter experts
- Learning design and multimedia professionals
- Library professionals
- Graphic artists
- Technologists and developers
- Administrators

Value Proposition
- More affordable access to high quality courses for learners traditionally excluded from the formal education sector.
- Low cost, low barrier pathways to formal academic credit for "non-traditional" learners.
- Pathways to transition to higher education.
- Low cost, low risk but high impact innovation in open education.
- Developing learning literacies for a digital age.
- International and intercultural open online course experience.

Customer Relationships

Self-service
The OERu develops high-quality open online courses designed for independent study which are mapped to the learning outcomes of courses available for formal academic credit at accredited partner institutions. The courses are:
- Offered at no-cost to OERu learners
- Do not require the purchase of any proprietary resources (eg textbooks)
- Do not require password access to view the materials.

Support
The OERu model does not provide tutorial support services from academic staff, however the following support options are available:
- Courses are designed to integrate peer-learning support through social media.
- Communication and interaction technologies accessible on the open web and selected support technologies hosted by the OER Foundation.
- Self-study help tutorials for core technologies.

Channels

Learning channels
Open online courses designed for independent study with peer-learning support offered at no cost to OERu learners.

Assessment channels
- Challenge examinations (proctored)
- 3rd party testing centres (automated assessment)
- Recognition of prior learning
- Graded assignments
- Credit transfer

Customer Segments

Adult independent learners
(Studying for formal credit)
- Socio-economic disadvantaged learners
- 2nd chance learners
- Reskilling for new career
- Mature learners studying 1st degree
- Degree completion learners
- Foreign students preparing for local national study
- RPL learners filling skills gaps
- Refugees and migrants

"Try before you buy" learners
(May convert to formal credit)
- Trialling higher learning (eg 1st in family or Secondary school learners.)
- Marginalised populations (can fail anonymously or take extra time before attempting assessment)

Professional development learners
(Micro-credentials / Open badges)
- Credentialled learners updating / expanding skills

Informal learners
(Self-motivated learners)
- Learners participating out of self-interest
- Learning for learning's sake

International brand promotion
Promoting international visibility through collaboration with the OERu international network of partners.

Cost Structure

Direct cost
- Annual membership fees to support shared central infrastructure (Gold partners contribute $4000 p.a. after multi-year discount)
- Staff time contribution towards collective planning and assembly of courses (Gold partners contribute 0.2 Full-time equivalent per year).
- Platinum partners who contribute more than $10,000 p.a eg shared positions for the network.

No "new money" approach
OERu partners nominate to assemble two courses from OER and open access materials. No increase in the marginal cost by applying a open license when developing an OERu course nomination that is part of normal organisational workflow for design and development. (Recurrent cost for assessment is recouped through fee for service.)

Reducing local development cost
Partners can diversify local curriculum offerings and reduce costs by reusing existing OERu courses without incurring local development costs. This is particularly attractive for low enrolment courses which are too expensive to produce locally in a cost effective way.

CC Licenses

Categories for OERu courses
(Free cultural works approved licenses is an OERu core principle of engagement.) Public Domain dedication
CC0
CC BY
CC BY-SA

External resources
(OERu courses may link to external resources) CC BY-ND
CC BY-NC
CC BY-NC-SA
CC BY-NC-ND
Open access "all rights reserved"

Social Good
- The OERu provides more affordable access to quality higher education for learners excluded from tertiary education for financial or physical access reasons.
- Philanthropic contribution to building more sustainable education systems using OER.
- Modelling open governance and open management approaches in education
- Leverage network models for "open sourcing" education for all without compromising the fiscal sustainability of the public funded tertiary sector.

Revenue Streams

Cost recovery model (& potential transfer to study benefit)
(Most partners are contributing to OERu as community service on the basis that "no new money" is required)
- Fees for assessment-only services (to cover administration and staff costs for grading)
- New students who transfer for full-fee study.

Value added services
(Some OERu partners are planning to better serve the community through value added services which may include new revenue streams.)
- Optional "pay as you go" tutorial support services
- Fees for micro-credentialling / professional development certifications.

Note
1. OERu partners are autonomous and retain decision-making over all aspects of assessment including the price for services.
2. The OER Foundation as an independent charity does not share in any revenue generated from partners for services arising from the OERu collaboration.

Figure 4. OERu Business Model Canvas (OERu, 2015b)

There are other variants of this same idea. For example, Social Innovation Lab's Social Business Model Canvas attempts to adapt Osterwalder and Pigneur's Canvas by adding several subcategories to the original nine elements: it segments customer segments into customers and beneficiaries, making the argument that both independently should be considerations in a business model; likewise, Value Propositions is subdivided into Social Value Proposition, Customer Value Proposition, and Impact Measures ("How will you show that you are creating social impact?" [Social Innovation Lab, 2013]); and Revenue Streams becomes two categories, Revenue and Surplus, the latter of which asks how an organization will invest its profits.

Whichever model is utilized, the modified business model canvas can be a useful tool for institutions that are planning to introduce OER into a larger, sustainable business model. It could be used to help define their terms and their goals more clearly, without forcing them into the neoliberal model of determining the value of their programs and processes as commodities, whose effectiveness would be measured only in terms of revenue generation (Longden & Bélanger, 2013; Marginson, 2013; Newfield, 2016). To be effective, though, it needs to be utilized early in the planning stage for an OER project, not only to allow an institution to justify the expense and resources needed for such a project, but also to ensure the ongoing ability to measure the project's effectiveness and adherence to the mission.

Taken one by one, here are each of the categories that form the Mission Model Canvas:

Beneficiaries. For the typical postsecondary institution in Canada and the United States, the beneficiaries of an OER program are both direct and indirect. Certainly the

learners themselves are the most immediate beneficiaries. Various learner segments might include enrolled students, but also prospective students for whom the use of OER might enable them to enroll at a lower cost, and possibly learners interested in professional development and informal learners who may not want to pursue a formal credential. In addition to learners, though, there are other potential beneficiaries: educators and other academic staff, who could potentially benefit from the ability to collaborate with other educators and staff at other institutions in creating or adapting resources, or who might gain the opportunity to learn about or engage in open educational practices; other institutions, which might have the opportunity to partner with the institution in question in order to build on their own goals and missions; and the larger community and society as a whole, which would stand to benefit from the increase in educated citizens (Doyle & Skinner, 2017; Longden & Bélanger, 2013; McMahon, 2016; Miller et al., 2014). In some situations, such as was the case for Institution B, clients and other partner organizations would also be counted as beneficiaries.

Value Propositions. The value proposition is focused on value for beneficiaries, and it can take many forms, whether in terms of price, speed, or quality. The main idea of value proposition, however, is that some need or issue is being addressed. The questions to be answered in this category include: which problem are we helping to solve? Which need are we satisfying? (Osterwalder & Pigneur, 2010). The value proposition, then, will be different for each potential beneficiary (Blank, 2016). For example, the value of OER for students will be different from the value perceived by instructors and by other institutions. While it might focus on cost savings, there are likely other aspects of the value proposition that need to be considered: flexibility of use, for example, or the ease of collaboration

afforded by OER. As noted in the Beneficiaries category, community and society would stand to benefit from the increased educational levels afforded by access to a lower cost education, and other institutions would benefit as a result of more collaborative practices made possible by open licenses (Hylén, 2007; McAndrew, Farrow, Elliott-Cirigottis, & Law, 2012; Stacey, 2012).

  Deployment. Deployment, also known as Channels in the original Canvas, describes the means by which the institution would communicate with the beneficiaries and the process by which the service or product is conveyed and/or distributed. In the case of an OER program, learners would probably be reached online, with content distributed through a Learning Management System, and other communications handled through such means as social media outlets, email, and websites. Electronic communication and distribution are not necessarily a requirement: there are institutions that have created paper-based OER for physical brick-and-mortar classroom use, though that was not the case with any of the institutions examined in this study.

  Items included in the Deployment section will probably have some overlap with those in the Key Activities section, because curricular materials are the product itself but also education is only possible when it is conveyed or distributed. Creating a system for dissemination of OER, as well as the programs and structures needed to support this dissemination, is to both create the product and the means by which it is communicated. These include all of the systems developed and implemented by Institution C, as mentioned in Chapter 4: the creation of an accessible open library for high-quality OER textbooks and other materials; software enhancements to support collaborative creation and publication of OER on the existing platform; tagging of metadata; data migration; outreach

activities; and system integration. Development and deployment of such systems can carry significant costs.

  Buy-in/Support. Buy-in/Support is referred to as Customer Relationships in the original Business Model Canvas, but it is clear that in this context, there are other stakeholders beyond the direct customers who must also be engaged and supportive in order for an OER program to be successful. According to Blank (2016), the question to be asked here is, "For each beneficiary . . . how does the team get Buy-In from all the beneficiaries?" This means that not only must each beneficiary understand the value of OER for itself, but also that each must also support the benefits that others are receiving. All of the beneficiaries mentioned in the first section: learners, faculty and staff, other institutions, and the community as a whole, need to "buy in" to the proposition of OER and its value for each of the others. Faculty support is crucial for such an undertaking that involves their own labor and, for some, a challenge to the established way they have done this sort of work (Bates, 2005; Katz, 2016; Walji, 2016). In such a situation, faculty would need to see how OER enhances their ability to educate learners and extend their own research, and that it does so at a lower or at least reasonable cost.

  Perhaps most crucial and least easy to convince of the value of OER would be those who would be responsible for funding it: whether this is the legislative body or governmental agency that oversees the institution, or those who pay tuition to the institution. How does OER provide value, and what is their role in ensuring that?

  The question of cost as compared to that of the usual commercial models would also be a relevant question to address here. In addition, for an OER program to be sustainable, buy-in and support must be addressed and maintained in an ongoing way.

Mission Achievement. In many ways, this is the most important category, as none of the rest has any value if the institutional mission is not supported or furthered through these efforts. As noted previously, mission achievement typically cannot be measured solely in terms of revenue. While there is no metric that specifically measures the value of fulfilling an institutional mission, it would make sense for an institution to clearly spell out its goals for the use of OER, and how it would know that the plan had been effective. Wiley's notion of measuring "learning outcomes per dollar" (as Wiley puts it, "What if you could simultaneously save them significant money and improve their learning outcomes?") (Wiley, 2014b) might provide one means of ascertaining effectiveness, though it is one that nonetheless plays into the commodification of educational objectives that many in postsecondary education would rather not embrace. Another approach might be to establish goals relating to student persistence or completion within courses or degree programs, or to the institution's ability to attract or expand access to a particular category of learner, such as first-generation students or those from particular disadvantaged socioeconomic categories.

While the Mission Model Canvas replaces the Revenue Streams category with Mission Achievement, other variants add a similar category alongside Revenue Streams. These variants, as adapted by OERu (which adds a Social Good category) and Social Innovation Lab (which adds "Surplus" alongside Revenue), keep revenue as a dimension of the business model canvas, suggesting that revenue, while not the driving force behind the model as it might be in a for-profit enterprise, is still an important consideration (OERu, Business Model Canvas, 2015b; Social Innovation Lab, 2013).

Key Resources. Key resources, according to Osterwalder and Pigneur (2010), are the assets that are required to make a business model work. These are not necessarily resources that the institution already has in its possession; rather, they are the resources that would need to be in place for the project to run effectively. They can be physical, intellectual, human, and/or financial, depending on the business model. For OER, these resources can be all of the above, depending on the approach to be utilized by the institution. Physical resources would include buildings but also computer hardware; intellectual resources would include copyrights, open licenses, software and other aspects of the necessary technological infrastructure, and also data to help drive decision making. Human resources, of course, are especially needed in such a knowledge-intensive undertaking as the creation and management of an OER program (Bernstein, 2014; Osterwalder & Pigneur, 2010): general competencies and skills, specific knowledge of how to harness technology and intellectual property, subject-matter expertise to develop and curate resources, strategic planning ability to position OER within the construct of a university curriculum and community needs, the design of interfaces with the materials— all are aspects of human resources that would be needed. Finally, financial resources must also be considered: whether this is funding from the state or province, membership fees contributed by partners (as in the case of OERu), charitable or foundation funding, or cash on hand.

Within the context of this study, it is important that all such resources be sustainable, rather than one-time infusions of cash or temporary access to a subject-matter expert. If such resources are temporary, any effective business model would need to consider how the loss of this resource could be replaced or compensated.

Key Activities. The key activities segment would include everything the

organization must do in order to make its business model operational. For the

implementation of OER, that would include much of the intellectual work noted

previously: strategic planning, fostering communications and collaboration both within the

institution and externally, curation and creation of open resources, review of content and

other materials, integration of resources with existing course materials and curriculum, and

development of supporting materials such as documentation, websites, assessment

development, and general policy creation. This section would also include development

and adaptation of the necessary technologies to sustain the program, and the maintenance

of a platform where the materials are created and deployed.

While the key activities might seem to the institutional leaders creating the business

model to be an exercise in stating the obvious, sketching the activities out as part of the

Business Model canvas can be useful, nonetheless. This exercise allows planners to

consider all of the activities that are necessary for the value proposition of the model to be

effective: not only the main activities (creation and curation of OER) but also the ancillary,

supporting activities (developing assessments for evaluating resource effectiveness,

developing classroom assessments to measure learning that is derived from use of the

resources in the classroom, creation of technical manuals) that are necessary.

Key Partnerships. For an OER-based business model, the way this category is

rendered will be somewhat different from the way this would be handled for other

activities and organizations. This segment typically includes answers to questions such as

"Who are our Key Partners? Who are our key suppliers? Which Key Resources are we

acquiring from partners? Which Key Activities do partners perform?" (Osterwalder &

Pigneur, 2010, p. 39). In the case of OER models, however, some of these questions are answered in a way that would not be typical of other organizations. While key partners can be considered to be other collaborating institutions, as well as funders such as government agencies and philanthropic organizations, key suppliers are not necessarily vendors and organizations that might typically form part of the supply chain. Instead, the "supplies" include existing OER materials and materials formed through a collaborative process, where the actual supplier might not be a single clearly-defined entity. Such key resources acquired from partners might be only partly "acquired," as again, they are likely to be crowd-sourced or collaboratively produced. Thus the usual definitions of transactions do not always apply in situations involving openly-sourced materials.

Mission Cost/Budget. This has already been described above. Mission cost and budget are those costs that serve to further the mission. Other costs that may be incurred while developing n OER program or integrating OER into an institution's business model would not be included in this part of the business model canvas. Mission costs might include the cost of labor needed to develop educational resources or to create a library or database to house resources; membership fees in a consortium; losses incurred through decline of sales of commercial textbooks; or marketing expenses to promote the OER program. In short, any key resource or key activity identified in those sections, if they carry any sort of cost, should be considered in this segment. In terms of the question of sustainability, the question of whether costs will remain at the same level over an extended period of time, or whether they might increase or decrease, should also be considered.

Summary

An example of how a sustainable business model using OER might be built is included as Figure 5 (Stacey, 2015). As noted previously, the limitation of this approach is that it is only focused on OER and related operation, rather than a whole institution. Taken together, while these segments of a business model will not create any certainty as to the success of a business model utilizing OER, they can serve to minimize surprises and to help institutions plan for effective integration of OER into a business model. None of the institutions examined in this study considered these questions at the outset of their initiatives; OERu did develop their business model at an early stage of their existence, but only four years later did they create a business model canvas, which they continue to refine.
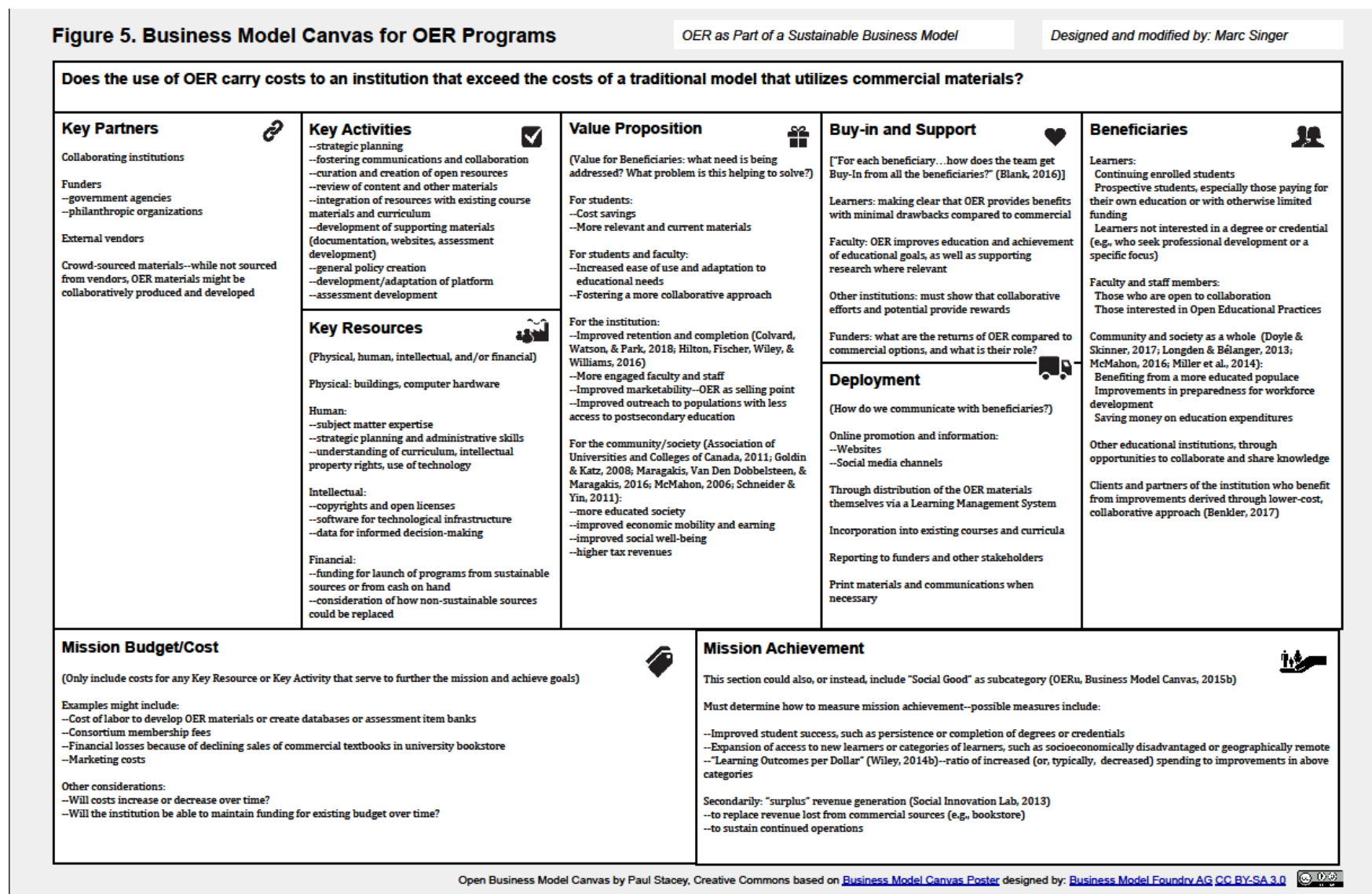
Figure 5. Business Model Canvas for OER Programs, based on template by Stacey (2015).

Implications and Suggestions for Future Research

As noted at the beginning of this chapter, upon launching their OER initiatives, none of the institutional subjects of these case studies had attempted to directly compare the costs (to themselves) of utilizing OER to those associated with the use of commercial materials. In fact, for the most part, there is very little evidence to indicate that most postsecondary institutions have an understanding of how economic incentives and efficiencies can be applied to budgeting processes. Alternatively, if they do understand such effects, they are unable or unwilling to balance financial questions with other competing considerations. For example, if an institution's mission is to expand access to education, there are few measures of effectiveness that can take into account cost as a condition of expanded access in a meaningful way. In any case, such a measure would only be useful if an institution had first decided for itself how much it is willing to spend in proportion to improving its educational outcomes—in other words, that it had identified a reasonable ratio using Wiley's imagined metric, "learning outcomes per dollar" (Wiley, 2014b). Another reason why institutions have not considered financial questions when evaluating their effectiveness is that many educators fear that any consideration of the question of efficiencies can lead down the path to a neoliberal approach to costing. For instance, pricing individual degree programs differently, based on what the market will bear, could lead to a situation in which programs that are perceived to have the most practical value charge less tuition than presumably frivolous, or less "useful," degrees (Stange, 2013). In some cases in the US, this logic has been taken to its extreme: programs that are not perceived to lead to practical or in-demand skills have been targeted for elimination by governors (Seltzer, 2017). In several other states, tuition has been increased

for those degree programs that are perceived to have greater market value (Alvarez, 2012; Stange, 2013). For the most part, institutions have resisted the idea of pricing programs of study and individual departmental offerings differently, which might maximize "efficiency" but create problems concerning quality, equity, and fairness (Burer & Fethke, 2016; Lang, 2017). However, the increasing use of responsibility center budgeting, which rewards entrepreneurial management and thus decentralizes budgeting and accountability, has also raised similar issues (Deering & Lang, 2015; Lang, 2017; Soares et al., 2016).

In keeping with our understanding of postsecondary institutions as complex adaptive systems that must evolve and change on a continuing basis in a context of uncertainty, it is also difficult for institutions to control, and control for, factors beyond cost such as the evolving demand for higher education, the education needs of the changing workplace, shifts in demographics, emerging and shifting political goals, and a continually evolving sense of the role of the university in society. Such complex adaptive systems must deal with complex, non-linear interdependencies both within the institutions and outside them, linking them to external entities (Cohen et al., 2011; Hetherington, 2013). Institutions are self-organizing and self-regenerating, but can rarely predict the directions in which they will need to move. As Morgan (2006) has described, numerous metaphors have been deployed to characterize organizations like this—whether as organisms, cultures unto themselves, brains, or systems—but regardless of the governing metaphor, it is difficult for institutions to consider and prepare for every eventuality. Additionally, specifically in regard to OER, there is a nexus of competing and overlapping issues relating to equity, quality, sharing, and cost. As discussed previously, some

university stakeholders might perceive increased access as lowered standards and reduced exclusivity for the institution, and with that a challenge to their own status.

Nonetheless, while the challenges are great and the landscape keeps shifting, institutions must do their best to integrate offerings such as OER into their curriculum and their business model, if only because the benefits to students of doing so are clear. The application of a Mission-Driven Business Model, as demonstrated here, has the potential to sort out some, but not all, of these issues. Though these institutions have much in common in terms of their missions, each is navigating its own unique, constantly evolving landscape. This is consistent with the case model approach employed in this study, with its connection to complexity theory and contingency theory approaches: the goal has not been to force these institutions into neat, well-ordered systems, nor to expect them to operate within a clearly defined, consistent, static set of interdependencies. Ideally, then, an institution would regularly revisit its business model for OER and its entire organization to ensure that goals have not changed, not to mention to acknowledge that external realities will have changed. The OERu is exemplary in this way. It regularly reviews and updates its strategic plan, which it refers to as an "evergreen" strategic plan, including its goals and objectives. As noted in its 2018-2021 Strategic Plan, "Each year the strategic goals are reviewed, operational priorities for the forthcoming year are identified and key performance indicators for the plan are recalibrated" (OERu, "Strategic Plan 2018-2021," 2018b). While the network's goals have remained more or less constant, the objectives have been adapted in response to the changing higher education marketplace, and as other sources and methods of OER have emerged.

It is possible that one or more of the subsidiary questions informing this study are closer to being addressed, but they have not definitively been decided here:

1. *Should calculations of cost and benefit be limited to those that are internal to an institution, or should other factors that are beyond an institution's own considerations, such as social and nonmarket benefits (McMahon, 2006), or to other institutions through the sharing of resources, or the economic benefits to a nation of investing in a more educated workforce, be considered?*

2. *Could a metric be designed that assigns a monetary value to some of the key functions and goals of a higher education institution: for instance, how much is an increased retention rate or graduation rate worth to an institution in fulfilling its mission? Specifically, for OER: can a monetary value be assigned to openness?*

3. *Is a business model that is based on OER more sustainable than the models currently in place within higher education?*

The answer to the first question—how to measure the scope of who benefits from, and should contribute to, the sustained success of an institution of higher education—is subjective, but numerous researchers (Doyle & Skinner, 2017; Goldin & Katz, 2008; Longden & Bélanger, 2013; McMahon, 2006, 2015, 2016; Oreopoulos & Salvanes, 2009; Organisation for Economic Co-operation and Development, 2012) have made the case that the benefits that come from postsecondary education—economic, but also non-market and social—extend well beyond the individuals who enroll in such institutions. The benefits to others in the community and the nation should be considered, and the responsibility for ensuring that such benefits continue, and are expanded, should be shared. Any society that

would consider the value of its postsecondary institutions to be limited to their ability to generate direct revenue, without an understanding of how such institutions, like others such as primary schools, hospitals, and courthouses, function as part of the vast network of interdependencies, supporting the advancement of that society, is taking a shortsighted view, and failing to consider the consequences of abandoning support for such institutions.

The second question, that of assigning a monetary value to the accomplishment of an institution's mission and goals, could likewise be answered by institutions or researchers in a variety of ways, depending on the values and mission of the institution under review; its ability to obtain and sustain funding; the number of skilled jobs in the community that require an advanced education to obtain them; what it would cost to cost to produce each education outcome by other means (McMahon, 2016); and the goals of its students. Such a measurement would also have to consider the social and non-market costs of not spending money to increase student success rates; in other words, what benefits are lost because of a failure to finance such efforts (Schneider & Yin, 2011). An additional dimension of constructing such a metric would be to evaluate whether the use of OER, whether it costs the institution more money to implement or not, could contribute to the accomplishment of any of these goals: not only because it can save students money, but also through any changes to pedagogy that might somehow affect learners' ability to earn more money, maintain higher levels of health and well-being, and become more informed or contributing citizens. Cost savings and other pedagogical advantages achieved via OER could also be taken into account as per Wiley's notion of learning outcomes per dollar (2014b).

While achievement of social goals and related values might be difficult to incorporate into a discussion of financial sustainability, it would be useful, though outside the scope of this study, to explore whether a metric could be designed that assigns a monetary value to some of the key functions of a higher education institution: for instance, the degree to which an increased retention rate or graduation rate has worth to an institution in fulfilling its mission, or the value of those same rates to the nation as a whole. This would require a consideration of the role of higher education within a national or local system, how institutions receive government funding based on performance, and how much value there is in a more educated workforce within a region or nation.

The third subsidiary question—Is a business model that is based on OER more sustainable than the models currently in place within higher education?—is the crucial one for postsecondary institutions in the current social, economic, and political context. A business model that is based in part on the use of OER does seem to support the ongoing financial stability of several of the institutions discussed in this study, particularly Institutions B and D. Enrollments have increased and new partnerships have been created at these institutions as a result of the use of OER, generating new revenues that would not have been possible without OER. Beyond this, the OERu's model is a promising one for institutions and for learners alike. A collaborative model that allows each institution to share its expertise with other like-minded organizations, to draw upon the expertise and resources of others in turn, and yet to make its own determination as to which resources to use and to what ends, has the potential to serve both the mission and the business model of each participating institution. Additional research into such models to determine their scalability and their effectiveness would be welcome.

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Appendix A: Institutional/Organizational Mission Statements

Table 1. Institutional/Organizational Mission Statements taken from their websites, May, 2019.

	Institution A	Institution B	Institution C	Institution D	OERu
Type	Public community college (United States)	Public (Canada)	Public, open enrollment (Canada)	Public, open access (United States)	non-profit organization
Mission	OUR MISSION: We empower our students to change their lives, and we enrich the life of our community. We are accountable for our results. OUR VISION: With a sense of urgency for the future, [Institution A] will be a national model of educational excellence, opportunity, and student success. Our organization will be characterized by agility and relevance as it meets the dynamic challenges facing our students and community. OUR VALUES: EXCELLENCE * INTEGRITY * INNOVATION * DIVERSITY * STEWARDSHIP * SUSTAINABILITY [Institution A] has grown into an institution where radical inclusion—that is, deeply rooted values of welcoming all individuals who seek higher education or continuing education—is an essential element of our identity. By intentionally cultivating our campuses as places where equal opportunity flourishes, we have advanced our own educational mission, contributed to the aspirations of [this] County, and added to the vision of our nation. We are here to ensure that every student—regardless of ability, background, economic status, race, or age—has access to higher education. One of our main challenges is to focus on equity in success. This means that we provide all students, including those from disadvantaged backgrounds who typically don't perform as well in college, with the assistance, opportunities, and tools not just to attend college but to effectively reach their goals. Our job is to ensure that everyone has the ability to achieve success by redesigning our institutions for those outcomes. [Institution A] faculty and staff have gone to great lengths to create robust learning environments where all persons feel safe voicing their perspectives and where intellectual rigor is the basis for engaging across difference. The College will continue to affirm the rights of all persons to study and pursue opportunity through education, free from fear and distraction. Our institution will continue to be a place where diversity thrives and where difference is celebrated.	[Institution B] is unique among post-secondary institutions in Canada with a mission to develop dynamic justice and public safety professionals through its exceptional applied education, training and research.	The special mission of [Institution C] is the advancement of applied knowledge and research to address societal need, and the provision of programs of study that provide a balance between theory and application and that prepare students for careers in professional and quasi-professional fields. As a leading centre for applied education, [Institution C] is recognized for the excellence of its teaching, the relevance of its curriculum, the success of its students in achieving their academic and career objectives, the quality of its scholarship, research and creative activity and its commitment to accessibility, lifelong learning and involvement in the broader community. Mission of [Continuing Education School within Institution C]: To be a leader in innovative, quality, lifelong learning that empowers adults to reach their life and career goals.	The mission of [Institution D] is improving the lives of adult learners. We will accomplish this by: - Operating as [State]'s open university, serving working adults; military servicemen and servicewomen and their families; and veterans who reside in [State], across the United States, and around the world; - Providing our students with affordable, open access to valued, quality higher education; and - Serving as a recognized leader in career-relevant education, embracing innovation and change aligned with our purpose, and sharing our perspectives and expertise.	[From oeru.org:] The OERu makes higher education accessible to everyone. Coordinated by the OER Foundation, an independent, not-for-profit organization, the OERu network of institutions offers free online courses for students worldwide. The OERu partners also provide affordable ways for learners to gain academic credit towards qualifications from recognized institutions. Through the OER Foundation, the OERu network continually works towards: - widening access and reducing the cost of tertiary study for learners everywhere, and especially for those who are excluded from the formal education sector - covering the operational cost of institution-based OERu services on a cost-recovery basis (or alternative revenue source) - providing pathways for students to achieve credible credentials for approved courses based solely on open education resources (OER). OER means learning materials that have been released under an intellectual property license, permitting their free use or re-purposing by others - optimizing the visibility and impact of the community service mission required of tertiary education institutions. [From 2018-2021 Strategic Plan:] Members of the OERu network demonstrate their public service missions through the provision of alternate pathways to credible credentials using open education approaches.

(source: institutional websites, accessed May 2019).

Appendix B: Data Gathering Prospectus.

Overview and Request for Participation

Dissertation Research Project

Can Open Educational Resources be part of a sustainable business model for institutions of higher education?

Marc P. Singer, Doctoral Candidate

Athabasca University, Athabasca, AB

January 2018

Research Prospectus:

Can OER be part of a sustainable business model for institutions of higher education, whether in terms of dollars and cents or in terms of some equivalent measure?

The rapidly increasing cost of post-secondary education in the United States and Canada threatens to make education less accessible to students, even as the need for university credentials grows. One possible solution to this problem is the use of Open Educational Resources (OER), which can lower costs for students and allow institutions to share and collaborate on content development. The question of whether OER can be part of a sustainable business model for institutions of higher education, whether in terms of dollars and cents or some equivalent measure, is crucial. However, this problem has not been addressed in a systematic way, not have appropriate metrics been established. While on its face, it might seem self-evident that OER could be part of a cost-effective and sustainable solution to increasing costs and decreasing external support, enough evidence has not yet been gathered to substantiate that claim.

Most funding of initiatives for the creation and development of OER continues to come from foundations and government. While this funding has been a positive development, institutions cannot count on it as a permanent solution (Stacey, 2013). Once such external funding has dried up, higher education will need to determine whether and how to sustain OER initiatives.

This would be easier if there were an evidence base to support the notion that OER can be part of a sustainable business model. However, despite a widespread belief among proponents that OER can benefit students and institutions alike, there is scant evidence to support that belief, and this works against such a long-term commitment on the part of individual institutions. The research that does exist seems to indicate that students in courses that utilize OER have a better "course throughput rate" in terms of course completion and grades (Hilton et al., 2016), but there is little evidence that this can translate into financial sustainability for an individual institution. In addition, even if a causal link were established, there is not a direct correlation between student success and institutional success, since decisions about business operations and academic are not made by the same people. Many decisions about the use of OER are made by faculty (Walji, 2016), whose perspectives and motivations might be different from those of their institutions. Some faculty members raise concerns regarding OER about quality, as well as potential loss of royalties from sales of their own textbooks. Institutions that create OER through grants must still be in a position to take over the long-term care and maintenance of OER on their own.

The Research Problem

To address this challenge, this project will take on this problem through a multi-case study approach, examining the practices, policies, and expenditures of a number of North American post-secondary institutions that have attempted to incorporate the use of OER into their programs and their business model. This project will also examine the OERu, an international consortium of institutions that are collaborating on the creation of courses and academic credentials using

OER. *The goal is to determine whether OER can be part of a sustainable business model or, at least a model that is more sustainable than the current ones used by postsecondary institutions.*

A primary goal of this study is to pave the way for further research into the sustainability of OER as part of a business model for postsecondary institutions and the societies they serve. Such future research would include these subsidiary questions, which will inform this investigation, but not be answered by it:

1.   Should calculations of cost and benefit be limited to those that are internal to an institution, or should other factors that are beyond an institution's own considerations, such as social and nonmarket benefits (McMahon, 2006), or the economic benefits to a nation of investing in a more educated workforce, be considered?

2.   Could a metric be designed that assigns a monetary value to some of the key functions and goals of a higher education institution: for instance, how much is an increased retention rate or graduation rate worth to an institution in fulfilling its mission? Specifically, for OER: can a monetary value be assigned to openness?

This study will provide institutions with a financial basis for making decisions about how, and whether or not, to utilize OER within their organizations. First, it will determine the appropriate metrics for measuring the value and sustainability of academic programs, both within an institution and within the larger scope of the society in which it operates. These metrics will take into account both the revenues and costs generated by an academic program, as well as the social and nonmarket costs and benefits that have been less easily quantified but are, nonetheless, measurable. Finally, the study will apply these metrics to OER—their costs and the revenues generated by them, the values they represent, and the potential costs and advantages they provide —to determine whether OER can be part of a sustainable business model.

Methodology and Approach

To fully consider this issue, it is important to use a quantitative approach when it comes to revenues, but a qualitative approach is also needed to understand the reasons why an institution might utilize OER. Such reasons might include a commitment to openness and collaboration, or a unique sense of mission or conception of value, all of which might vary from institution to institution and from individual to individual. In other words, this study will be an examination of the financial costs and benefits, whether direct or indirect, that are part of an institutional business model, but also how finances allow institutions to achieve their goals—what they value. The most practical approach for achieving this would be, as noted previously, to draw upon a few case studies as a basis for developing a model. Certainly, the distinction between revenue and value, addressed in the literature, will also need attention, since this is really a question not only of money, but of how universities can use money to help them sustain and fulfill their missions and goals (Lane, 2012; Law, 2016).

The case studies will need to include an analysis of financial data concerning these institutions' use of OER:

- costs, including where money was spent, and on what;

- revenues, including where revenues came from, how pricing was established, and how it might have affected revenues;

- comparisons to costs and revenues of other non-OER programs;

- changes over time, where possible.

While some aspects of the case studies will be based on analysis of data concerning costs and revenues, other aspects will need to address institutional values and mission. While some of that information could be obtained through public sources such as websites and publications, there might be a need to conduct interviews to supplement the gathering of data. Interviews would be utilized primarily to determine how the institutions view OER as helping them to fulfill their goals and missions.

For this initial stage of the study, the case studies will help to determine the following:

- how and to what extent the reviewed institutions are investing in OER,

- how the costs involved in the use of OER (whether toward the creation of their own resources or the adoption of existing resources) compare to costs associated with other, non-OER curricular materials,

- the extent to which external funding has played a part in the implementation of OER,

- how the use of OER has affected retention rates and graduation rates,

- how they see it benefiting their institutions and their students, and

- how the institutions see OER as part of or compatible with their goals and missions.

Analysis of the data will focus on the financial aspects of the use of OER: institutional costs and revenues. The study will use the data gathered from the case studies to determine the costs of OER as a proportion of the overall budget expenditures and revenues of the institution, and then combine that, if possible, with measures of nonmarket and social benefits that can be attributed to higher education in order to determine how the use of OER might contribute to those benefits.

In addition, use of the data collected regarding the impact of OER on retention and graduation rates will depend on the extent to which other variables can be isolated from the effects of OER.

Desired Outcomes

The primary desired outcome of this study is to determine a resolution to the problem:

Can OER be part of a sustainable business model for institutions of higher education, whether in terms of dollars and cents or in terms of some equivalent measure?

Using an analysis of the case studies of several institutions, national and international data on the impact of higher education on both market and nonmarket benefits, and a review of data relating to the costs and revenues generated by OER in comparison with costs and revenues of non-OER materials and practices, the goal of this study is to reach an answer as to the viability of OER in building a sustainable business model for higher education.

Another desired outcome of this study is that it will suggest a direction for the development of a metric for placing value on certain institutional goals. For instance, how valuable is it to an institution or its sponsors and supporters to increase the graduation rate by one percent? What dollar amount can be assigned to a decreased attrition rate, or a more meaningful relationship between an institution and its community?

Summary of Steps in the Research Process

1. Conduct case studies to gather information on institutional use of OER, financial expenditures on OER, cost/revenue comparison to other methods, measurable benefits of OER.

2. Determine factors besides money that might affect impact of OER or extent of use.

3. Collect information regarding mission, values and goals of institutions from institutions themselves and other sources.

4. Review and analyze data sets regarding demographics, education, and the effects of education on social and nonmarket benefits to establish relationship between higher education and overall value to societies.

5. Assess effects of OER on revenue and these social and nonmarket factors.

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Appendix C: Survey Questions.

Question
Costs:
where money was spent, and on what
Adopt/adapt existing OER or create new?
Cost breakdown?
Revenues:
Where revenues came from
How pricing was established
How pricing (too high? Too low?) might have affected revenues
comparisons to costs and revenues of other non-OER programs
How long program has been in place
Changes over time if known
Plan for investing in OER
how the use of OER has affected retention rates and graduation rates
how the University sees OER as benefiting the institution and students
Extent to which external funding has played a part in the implementation of OER