



Open enough? Eight factors to consider when transitioning from closed to open resources and courses: A conceptual framework

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Abstract

Transitioning from closed courses and educational resources to open educational resources (OER) and open courseware (OCW) requires considerations of many factors beyond simply the use of an open licence. This paper examines the pedagogical choices and trade-offs involved in creating OER and OCW. Eight factors are identified that influence openness (open licensing, accessibility and usability standards, language, cultural considerations, support costs, digital distribution, and file formats). These factors are examined under closed, mixed and most open scenarios to relatively compare the amount of effort, willingness, skill and knowledge required. The paper concludes by suggesting that maximizing openness is not practical and argues that open educators should strive for 'open enough' rather than maximal openness.

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Introduction

The idea of being an "open educator" and developing and relying exclusively on course materials with an open license is, in principle, a noble pursuit. However, discussions around open education can be challenging in higher education contexts due to the varying and contested definitions of openness. Moreover, there is a lack of critical discussion around the negative pedagogical impacts of increasing openness and a need for recognition that 'open enough' is, in many cases, preferable to maximizing openness. Currently, there are few frameworks to instruct educators how to transition courses from closed to open.

Transitioning closed credit courses and resources to open materials requires specialized knowledge in a range of areas that often exceeds the educator's disciplinary expertise. Most importantly, educators must accept that opening education involves tradeoffs and that maximizing openness can undermine other pedagogical considerations. Furthermore, we argue that there are specific facets of openness that require less effort, knowledge, and skill than others. We have identified eight key factors to consider when transitioning from closed to open: open licensing, accessibility and usability standards, language, cultural considerations, support costs, digital distribution, and file formats. This paper explores the tradeoffs that exist in each of these factors as one transitions from closed to open.

In this conceptual paper, we aim to achieve the following. First, we will review the literature on openness

in education to help educators better understand the various, and sometimes conflicting, approaches to open education. We will also identify some of the major challenges educators face when adopting open teaching practices. Second, drawing on the challenges and considerations identified in the literature, and our experience as creators of open resources, we propose a conceptual framework for conceptualizing the choices educators must make when transitioning from closed to open. Our framework can be expanded into a series of decision matrices which are designed to be tools that could help educators determine the work required during the transition. Third, we will identify the limitations of this framework — such as its limited applicability to certain Open CourseWare (OCW) and Open Educational Resource (OER) types — and suggest directions for future research.



Situating OER creation within OEP/Open Praxis

Problematizing the implications of increasing openness necessitates understanding and unpacking the concept of openness itself; however, literature on open educational practices (OEP) and open educational resources (OER) is replete with multiple and often contradictory definitions of what the term ‘open’ implies. This discourse and disagreement about open education’s boundaries is not necessarily problematic. These conversations represent conceptual growth within the discipline. What is missing from the literature, and what we aim to address, is the lack of theoretical papers that address the multiple factors of ‘open’ and which factors are more or less conducive to pedagogical improvements. We feel the addition of this paper, and others, would provide aspiring open educators with a more concrete direction when undertaking OEP and OER projects.

It is important to note that within higher education there have been several cycles of openness going back centuries, and that there is a tendency for periods of contractions in openness to follow those where openness expands [1]. For example, “openness” in relation to the creation of the Open University UK in the late 1960s emphasized in part the removal of educational credentials as a barrier to accessing post-secondary education; however, such a view of openness is increasingly less common and less accepted [2]. Pomerantz and Peek (2016) in their review of over 50 different kinds of ‘opens’ (e.g., “open source software,” “open government,” etc.) found several different approaches of open including open meaning: rights, access, use, transparent, participatory, enabling openness, and being philosophically aligned with open principles. They caution that the term is also subject to abuse (“openwashing”) and highlight that the term is becoming increasingly ambiguous. Similarly, Hendricks (2015) notes openness implies not only presence of an open licence and free of cost, but also being editable and transparent. Importantly, she adds that if a work created with tools that are platform specific, very expensive or require a high level of technical expertise, then the works should be considered less open. She points to the Open Definition 2.1 (Open Knowledge Foundation, n.d.) that notes that in addition to the presence of an open licence a work must also be machine readable and in a format that can be processed by at least one free, libre, or open source software tool to be considered open. Conversely, Cronin [3] posits that openness in higher education represents four facets: open admission, open as free, OER, and OEP. Such conceptual approaches depart from more operational conceptions of openness such as Wiley’s 5Rs (retain, reuse, revise, remix and redistribute (Wiley, n.d.)). Despite the multiplicity of conceptions of open, a shortcoming of the movement has been a lack of theorizing around the concepts of openness and freedom [4]. Weller [5] notes the ambiguity of the term makes it open to being meaningless.

The ambiguity to what openness means is further complicated by the related set of terms within open education: OER, OEP, and open pedagogy. Hegarty [6] proposes eight attributes of open pedagogy, only one of which involves OER. Despite the lack of clarity as to how OER, OEP, and open pedagogy relate, what is key is that all three concepts tend towards a learner centrism and suggest that the primary goals of openness should be improving student learning [7]. Although much has been written about OER, the literature is comprised of a disproportionate number of institutional case studies whereby OER were implemented to reduce costs to students. While cost savings is a compelling and legitimate argument for the advancement of OER, pedagogy is the arguably the most important factor (McNally, 2014; Olcott, 2013). Stacey (2007), in an early analysis of MIT’s OCW project, noted that simply opening up in-class teaching materials did little to address online pedagogical considerations. Addressing the pedagogical implications of transitioning from closed resources to OER — and considering the workload and expertise required to complete and support OER or OCW projects — is paramount.

The literature on OEP contains many insights that inform our approach; however, at the same time we note the gap in critical discussions around the choices and consequences of open design as part of OEP. There is a need for greater consideration of the diversity of learners for OER, as their reach extends far beyond traditional learning objects in closed classrooms [8]. Lane [9] stresses that discussion of open education must examine both the principles and practicalities of openness; however, his work focuses on illustrating educational divides and not pedagogical consequences in open resource design. Ehlers [10] has argued that access issues have been overemphasized at the expense of discussions around promoting quality and innovation in teaching and learning. Ehlers provides a matrix for understanding how interaction between learning architecture and OER usage contributes to increased (or decreased) open

educational practices. Although his work focuses on conceptualizing OEP, it shares a degree of conceptual similarity with our work. Stagg (2014) provides a continuum for assessing OEP, moving from awareness of the issue to student co-creation over five different steps. But, his work does not discuss the decision factors in moving from closed to open courses or resources. While we identified eight major factors that must be considered when transitioning to open resources, having an understanding of copyright and open licensing frameworks is critical. Wiley and Gurrell (2009), in their overview of the open movement, highlight the importance of open licensing not just for OER but as a critical factor in the success of the open source software movement. However, as we will demonstrate, open licensing is only one factor of openness.

Our work is also informed by Paskevicius' [11] definition of open educational practices. Specifically, he defines OEP as:

Teaching and learning practices where openness is enacted within all aspects of instructional practice; including the design of learning outcomes, the selection of teaching resources, and the planning of activities and assessment. OEP engage both faculty and students with the use and creation of OER, draw attention to the potential afforded by open licenses, facilitate open peer-review, and support participatory student-directed projects.

We contend that an explicit element of OEP must also be a realization of the limitations and restrictions, particularly on pedagogy, imposed by openness.

With regards to specific discussions of pedagogical consequences of openness, the literature is underdeveloped. Geser (2007) stresses that OER should have open file formats, open metadata, and be produced with open source software, in addition to being openly licensed and free of charge. Nasccimbeni and Burgos (2016) argued that becoming an "open educator" is a transitional process which requires multiple steps. The authors define the open educator as someone who removes all "unnecessary barriers to learning," works openly and publicly through online/social networks, values the importance of collaboration, shares their teaching ideas, incorporates open content, and co-creates knowledge with students, among other things. Note that with the exception of the incorporation of OER content, the other aspects do not necessarily rely on OER. However, they do critique popular ideas of openness such as the co-creation of knowledge, open curriculum, and open assessments, as these are rehearsed ideas from proponents of active learning, such as Bonwell, who advocated for open education decades ago. The only differentiating factor is the existence of the Internet, which has brought with it a responsibility to openly share one's teaching materials more broadly.

Finally, it is important to underscore the critiques of OER/OEP that should inform open praxis. Rhetoric of the 'free' nature of OER can undermine the contributions of labour needed to create/adopt such resources (Almeida, 2017). OER does not address academic precariousness and it can advance neoliberalism in higher education (Crissinger, 2015). OER can be viewed as a form of academic neocolonialism (Weiland, 2015; Amiel, 2012; Almeida, 2017; Rhoads, *et al.*, 2013). The OECD's (2007) *Giving knowledge for free* warns that language and cultural barriers could result in developing countries becoming consumers rather than contributors to the expansion of knowledge. Sonwalkar, *et al.* (2013) provide an important qualification to this debate emphasizing that since OERs can be locally adapted they are less subject to claims of cultural imperialism than unadaptable MOOCs. Policy support for OER has tended toward simply viewing it as a cost savings for students rather than a means of improving pedagogy (Olcott, 2013).



Methodological considerations

The paper is informed by several methodological considerations and data sources. The primary consideration for the development of the factors is phenomenological self-reflection (Wolff, 2002; Polkinghorne, 1989; Colaizzi, 1973) on our experiences creating open resources and courses [12]. We have been involved in OCW and OER design both collectively and individually. While self-reflection can serve as a source of data, it is important to also consider presuppositions and biases in such data (Polkinghorne, 1989). To address these concerns the literature on OER development and best practices was also examined. For example the OECD's (2007) seminal *Giving knowledge for free* highlights several factors (accessibility, open licensing, language, cultural considerations, file formats, and digital distribution), and Richter and McPherson (2012) discuss language and cultural barriers to OER adoption. While the factors are identified in many sources, it is important to note the contribution of this paper is theorizing what tradeoffs exist and questioning whether there is a practical threshold for sufficiently, but not fully, open resources.

The conceptual scales are designed from the perspective of creating OCW as opposed to adapting them, though many of the tradeoffs among openness, and the skill, knowledge, and effort required, are also

factors in adapting resources. The scales were also developed to consider the facets of developing open courses, rather than individual OER, but are generally applicable to OER. Finally the scales employ simple relative comparators. Openness is grouped into scenarios of closed, mixed, and most open. The levels of effort, willingness, and skill/knowledge required have been broken down into relative groups of none, minimal, some, and more. These relative comparators are not absolute measures of the effort, willingness, and skill/knowledge required. Instead, they aim to show the differences among various closed, mixed, and most open scenarios.



A framework for conceptualizing openness

Educators who want to use OER to create a better learning experience for students are often unclear about how to transition their materials or adjust their pedagogy. OCW and OER projects require considerable forethought. If an educator has decided that using OER is appropriate for accomplishing their teaching goals, there are several choices and considerations they must recognize before undertaking a project. The eight primary factors to assess include:

- Copyright/open licensing frameworks
- Accessibility/usability formatting
- Language
- Support costs
- Assessment
- Digital distribution
- File format
- Cultural considerations

These factors are not binary. Instead, they exist on a spectrum of openness. We problematize, if each of these factors could be placed on a scale from “closed” to “most open,” what would be the implications, and could conceptualizing openness help educators estimate the work required for OER projects? If we were to imagine a spectrum of openness, what would these factors look like in various scenarios? Is there a threshold of effort and skill required where a resource can be sufficiently opened (‘open enough’) or fully opened? Conceptualizing openness not only provides direction to educators on how to plan OER projects, but it also has revealed some underlying problems with OER and openness more generally. We have chosen three broad scenarios on the spectrum of openness (closed, mixed, and most open), though we acknowledge that for some factors more granular divisions are possible.

To address these limitations, we have developed a three-step framework whereby an educator must consider each of the eight factors using multiple conceptual scales (see [Figure 1](#)). As we mention above, the framework is still geared toward OCW rather than discrete resources, though it has the potential to be used for both. While we use the term “course” throughout this paper, in many cases, it could be substituted with “resources.” The act of working through this process provides the educator with a more concrete understanding of what transitioning a course from closed to open involves.

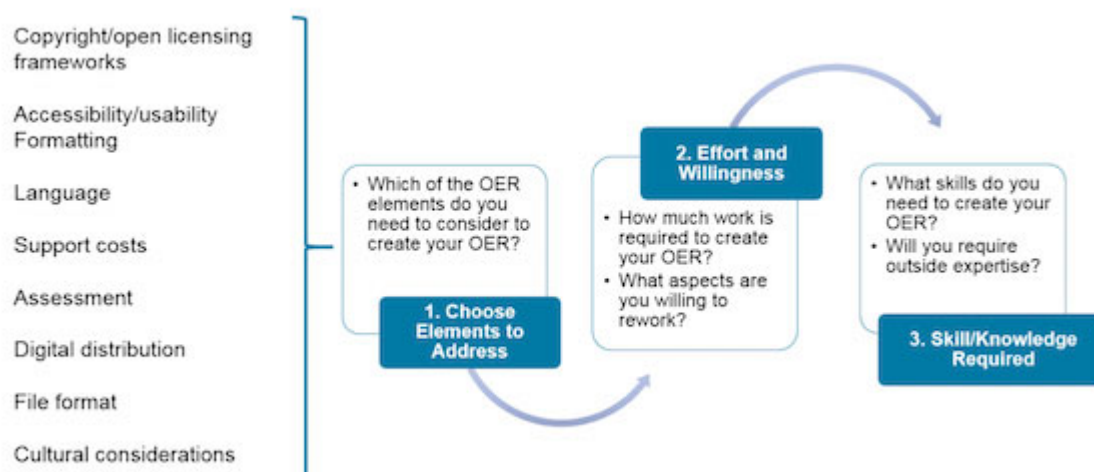


Figure 1: Decision-making process for transition from closed to open resources (Christiansen and McNally, 2017).

Note: Larger version available [here](#).



Conceptualizing closeness and openness at each step

All of the scales in our framework follow a consistent format. Each scale attempts to describe how all of the eight OCW/OER factors take shape under three hypothetical scenarios — *closed*, *mixed*, and *most open* (see [Figure 2](#)). Courses represented under the *closed* scenario would not qualify as OCW/OER. Instead, they would be analogous to traditional, face-to-face courses that primarily rely on paid publisher resources. These courses are not designed with openness in mind, and they are not designed to be altered or shared. Courses that fall under the *mixed* scenario often qualify as OCW/OER. However, while the factors represented here might allow for some adaptation and distribution, there are likely limitations to their openness. The *most open* scenario, as the name suggests, represents courses that take openness to the extreme — designed for maximum adaptability, distribution, and global relevance. The factors are also distinct, and as such it is possible to be most open in some factors and closed and mixed in others. However, the factors are not entirely independent as minimizing or maximizing openness in one factor may impact choices in other factors. For example, designing materials to be translated across several languages may also require removing culturally specific jargon and terminology. While the most open scenario maximizes openness, it is important to note that for many factors transitioning from mixed to most open may require a large degree of effort and skill. Maximizing openness involves a combination of skills and knowledge beyond that of most individual instructors.

Step 1) Choose elements to address

As a first step, it is critical that educators determine where to allocate their time. A common problem is that educators are unaware of the eight factors and how they change under each scenario. The first step to opening up materials is recognizing which factors shape openness, particularly beyond the presence or absence of an open license. Step 1 addresses this problem and we have subdivided it into two scales. The Overview of Decision Factors scale (see [Figure 2](#)) requires the educator to decide which of the OER factors need to be addressed during a given project. For many educators, this will be their primary scale of reference, as it provides a high-level overview of each factor under all three hypothetical scenarios. When transitioning full credit courses to open, it is likely all eight factors will require consideration. Transitioning discrete resources — such as assessments, lesson plans, or class activities — might only require some of the factors to be addressed.

OER Factors	Closed	Mixed	Most Open
Copyright/Open Licensing Frameworks	Copyright/all rights reserved	Less Open Creative Commons (CC) License Terms (e.g. Non-Commercial)	CC Attribution (CC-BY) License/ Public Domain
Accessibility/Usability Formatting	Not formatted for accessibility	Some accessibility formatting (e.g. closed captioning)	Fully accessibility (e.g. compliance w/ US HHS 508 Compliant)
Language	Single Language	Bi-lingual or includes guides/steps for translation	Multi-Lingual or includes guides/steps for translation and is bilingual
Support Costs	Paid resources	Licensed library resources	Openly Licensed Resources
Assessment	No assessments made publicly available, using an open licensing framework and is not shared through an OER repository	Assessment are publicly available using an open license; learners can self-assess, but not they are not meaningful (i.e. questions and assignment descriptions only)	Assessments made publicly available using an open license; meaningful self-assessment is possible (i.e. questions and answers provided)
Digital Distribution	Closed/available only to insiders (e.g. via Learning Management System)	Open but low discoverability (e.g. institutional repository)	Open and high discoverability (e.g. YouTube or broadly available repository (e.g. Merlot, BC campus)
File Format	A print resource, document image, PDF, or other non-editable format that cannot be altered without expensive software.	Editable proprietary file format that could be adapted using open software (e.g. .docx file edited using Libre Office).	Fully open format (e.g. html or .ODF) that could be edited using either open or proprietary software
Cultural Considerations	No consideration for outside cultural users/includes culturally specific materials/content	Some considerations for outside cultural users	Generally devoid of culturally specific material

Figure 2: Overview of decision factors.

Copyright/open licensing frameworks

Copyright is the most critical factor. Even if the rest of the factors maximize openness, the absence of an open license nullifies openness. Many university courses are represented under the closed scenario, for they would primarily utilize materials that are not openly licensed. This includes both the educator's intellectual property (syllabus, assignments, PowerPoint slides, notes, etc.) and publisher resources such as textbooks. It is the under mixed and most open scenarios where open licensing frameworks must be implemented. However, different open licenses possess different degrees of restrictiveness. For instance, Creative Commons (CC) licenses that incorporate terms such as the NonCommercial (NC), No Derivatives (ND), or ShareAlike (SA) place greater limits on the resource. The most open licensing approach is one that has minimal barriers to use. A CC Attribution (CC-BY) license would allow for the greatest adaptability and shareability, since it only requires attribution of the original author. Placing work in the public domain (which can be done through a CC0 mark) removes the requirement of attribution; however, authors putting a CC0 mark on their work should be mindful that they surrender all rights to that work.

Accessibility/usability formatting

This factor represents elements that enable users with visual, auditory, or physical disabilities to adequately use resources and participate in a course. According to the W3 Web Accessibility Initiative (2005), "Web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web." We also include usability considerations under this factor. According to Krug (2014) usability means "a person of average (or even below average) ability and experience can figure out how to use the thing [*i.e.*, it's learnable] ... to accomplish something [effective] without it being more trouble than it's worth [efficient]" [13]. In its most open form, resources

would be fully compliant to a standard such as the U.S. Department of Health and Human Services (HHS) (2016) accessibility checklists and would be intuitive for learners in a variety of contexts and cultures.

It is important to note that a variety of usability standards exists. For example Internet based OER would be more accessible when designed in accordance with the World Wide Web Consortium (W3C) accessibility guidelines. Our purpose in highlighting the HHS and W3C is not to suggest that these specific guidelines must be followed, but that openness with respect to accessibility can be maximized by following well established standards.

Language

Traditional courses are generally represented in one language. Courses that are bilingual would fall under the mixed scenario, and they are more likely designed for two different demographics in a geographic area — such as anglophone or francophone speakers in Canada. Very rarely would a course fall under the most open scenario — existing in multiple languages.

A second way in which language can be made more open is that the content be designed to facilitate translation. A number of simple techniques can be used to facilitate easy translation such as clear and consistent writing, avoiding use of synonyms, and using simplified terms and sentence construction (Sajan, n.d.); however, such practices may not be well received by certain academic audiences. Writing for translation represents a notable pedagogical tradeoff. Creators can also include guides for potential translators where key concepts and terms are specifically documented and defined (*i.e.*, in a glossary).

Support costs (for the resource)

The support costs factor is particularly relevant to open courses and less so for discrete resources, and it encompasses two dimensions. One aspect of support costs is the cost for supplementary materials. With respect to an open course, the lecture material may be open but readings could be from closed journal articles or books. While in some cases these materials may be available to learners through academic or public libraries, some users might have to purchase supporting material thus reducing openness.

Support costs are also involved in hosting large scale OCW/OER projects. This requires servers that can host course data and handle traffic for potentially thousands of learners. In a traditional credit course, this is not a concern. In a mixed scenario, a course might have some open content hosted on servers, but a good portion of the content might be licensed library resources or open Web-based materials. It would not only rely on open access readings, but all text and multimedia course materials would be hosted online and available through a Web interface.

Assessment

Assessments are an essential component of any course — closed or open. A completely closed course (in our example) would only make assessments available to enrolled students. Those assessments do not have an open license and are not made available through an OER repository, where other educators could adopt and adapt the assessment for their own course. In other words, the assignments are locked behind a learning management system. Furthermore, such assessments tend not to be designed for student self-assessment but instructor assessment. Learners not enrolled in closed course are unable to assess their own learning. More open courses should include freely available assessments that allow learners not enrolled in the course to self-assess their understanding of the course content (assuming that is also available) as they progress through the material. Under the mixed scenario, assessments might be less meaningful in that only questions, not answers, would be provided. For example, self-directed learners engaging with the material might see that an assessment question that requires them to write a short answer or longer paper on a particular topic; however, they would have no way of having their work assessed. Still, the fact that such learners could see what types of questions were used for assessment makes the course more open. Having assessments available also benefits other instructors who may adopt or adapt the materials. Under the most open scenario, the course would include meaningful assessment — accompanied by both the questions and answers. To facilitate the most open scenario the assessment mechanisms would have to consist only of objective questions (*e.g.*, true and false, multiple choice) so the learner could self-assess and determine areas of strength or weakness. Under the most open scenario, the learner could feasibly complete the course without facilitation by an instructor.

Digital distribution

Distribution and sharing is core to the open movement. Traditional closed courses are often made available via a Learning Management System (LMS) that is only accessible to registered students. As we move from closed to mixed, course materials are made available for sharing but their discoverability is low. Distribution in these cases may take the form of an institutional repository that is not connected to a broader search engine or through an instructor's personal Web site. The most open materials reside in large OCW/OER databases which can be searched — making the probability of discovery by learners and educators high. However, it is important to note that as the number of OCW/OER materials increases in key repositories such as the OER Commons or Open Education Consortium, high volume can result in

decreased discoverability.

File format

The file format factor is really about editability. In a traditional closed credit course, course materials are not designed to be edited by anyone other than the educator. Class documents may be distributed only in print format or are likely available in a non-editable file format (e.g., .pdf, .jpeg, .png, etc.) through a learning management system. This is logical, as educators do not want learners editing the materials or instructions. We consider these closed formats (even though PDFs and image formats are open standards) because they are difficult to alter *and* require expensive specialized software (such as Adobe Acrobat Pro).

As a course moves to the mixed scenario, the resources become more editable. For instance, the resources could be distributed in a proprietary file format (such as Microsoft's .docx, .pptx, .xlsx, and .rtf formats) that can be edited using open software (such as Libre Office or Open Office). So, there is nuance between propriety formats that are not open (from an open source standpoint) but are a public standard.

Courses that fall under the most open scenario, would provide resources in a completely open and editable format. Common examples of open formats could include open document format (.ODF), HTML, and plain text (.txt). Open formats could be edited using either open or proprietary software. What differentiates the mixed and most open scenarios is the possibility that educators could download completely open and editable file formats and alter them using completely free and open source tools. Open file formats can pose problems, as some users are likely to be less familiar with the editing tools — particularly HTML which requires specialized knowledge of the markup language. Providing a multitude of file formats (both open and proprietary) increases the possibility that the user can edit the documents, and it also addresses some of the limitations of relying solely on the most open formats. This scenario exemplifies the challenges of prescribing three broad scenarios to conceptualize open education, as there are variations in between. Again, the scenarios we have posed are broad, and are designed to illustrate points on a much wider spectrum.

Cultural considerations

Perhaps the most challenging factor to address is cultural considerations. Albright (2005) notes that cultural misunderstandings between creators and learners can result in dysfunctional education. Like language, is it not realistic to have resources that are relevant to all cultural contexts. There are things educators can do to increase relevance. Closed resources make use of specific cultural references or might be localized to a specific geographic context. A resource developed for a Canadian audience might adjust examples for both anglophone and francophone audiences. The most open courses are those that are devoid of any culturally specific jargon, humour, and phrases. Like the language factor, most open courses might also include instructions to educators for how to tailor the course for different cultural audiences. In some cases, it may be impossible to make content on certain topics maximally open. For example, a course on the urban geography of New Orleans has to be about New Orleans; it is unclear how the specific local context could be abstracted enough that the same course could apply equally to Lagos or Osaka without any substantive modification.

Cultural considerations are often overlooked, but we feel it is critical for advancing OER globally. There is some concern that because so much of the world's OER content is created in the West, that OER can be seen as a form of neocolonialism (OECD, 2007; Weiland, 2015; Crissinger, 2015; Ameil, 2012; Almeida, 2017; Rhoads, *et al.*, 2013). For example, when examining MIT's OpenCourseWare site statistics, we can see that only four percent of traffic comes from South America and only six percent from Africa. By comparison, North America and Europe (including Russia) account for 61 percent of all traffic (MIT OpenCourseWare, n.d.).

Defaultness in choice of factors

Openness often requires choice, but not always, and for some factors instructors must intentionally choose the closed scenario. The second scale in Step 1 is the Defaultness in Choice of Factors (see [Figure 3](#)). This scale is binary, insofar that it indicates whether the educator needs to make a choice for each factor.

OER Factors	Closed	Mixed	Most Open
Copyright/Open Licensing Frameworks	Default: Creator holds all copyright	Choice Required	
Accessibility/Usability Formatting	Default: Not necessary unless being used by the broader public		
Language	Default: For native language		
Support Costs	Choice required: Textbooks cost students money, but closed scholarly journals from the library can supplement textbooks at no cost to students		
Assessment	Default: Assessments available only to enrolled students		
Digital Distribution	Choice required: At discretion of the educator		
File Format	Choice required: At the discretion of the educator		
Cultural Considerations	Default: No considerations required for native audience		

Figure 3: Defaultness in choice of factors.

For resources under the mixed and most open scenarios a choice is always required, while Copyright, Accessibility/usability formatting, Language, Assessment, and Cultural considerations are all closed by default.

However, some of the factors under the closed scenario still require a choice. In the case of OCW, one still has to choose readings which impact the Support costs factor. It is not necessarily a default that readings cost money. Instead of having students purchase a textbook, the educator could choose journal articles from a library database. These materials would be copyrighted materials *and* would reduce costs to students. Distribution and File format have no default option, and the educator must actively choose closed or more open distribution and formats.

Highlighting defaultness is important because it underscores that for three of the eight factors, educators must actually choose to make something closed. For the remaining five factors creators must choose openness. The role of choice in openness leads to the following section where we examine the roles of effort and willingness in openness. Given the spectrum of openness that exists across the eight factors, what role do effort and willingness play in shaping openness?

Step 2) Effort and willingness

OCW/OER projects can require significantly more time to develop and therefore require a greater time investment on behalf of the educator. Openness requires both willingness, a commitment to be open, and additional effort to make content open. For this step, we have created a scale that theorizes the willingness and effort across the openness spectrum (see [Figure 4](#)). We have chosen to differentiate between effort and willingness (or inclination to openness); for factors that require a choice to be closed, the amount of effort to increase openness diverges from the amount of willingness needed to increase openness.

OER Factors	Closed	Mixed	Most Open
Copyright/Open Licensing Frameworks	Closed by default	Minimal willingness/effort	Some willingness
			Minimal effort
Accessibility/Usability Formatting	Closed by default	Some willingness/effort	More willingness/effort
Language	Closed by default	More willingness/effort	More willingness/effort
Support Costs	No willingness	Some willingness/effort	More willingness/effort
	Minimal effort		
Assessment	Closed by default	Some willingness/effort	More willingness/effort
Digital Distribution	No willingness	Some willingness/effort	Some willingness/effort
	Minimal effort		
File Format	No willingness	Minimal willingness/effort	Minimal willingness/effort
	Minimal effort		
Cultural Considerations	Closed by default	Some willingness/effort	More willingness/effort

Figure 4: Effort and willingness for factors in closed, mixed, and most open scenarios.

When constructing the willingness/effort scales, what emerged was a realization that the additional effort required to maximize openness is often unnecessary and unattainable, and that in some cases effort and willingness diverge. Moving a course from copyrighted to mixed only requires minimal willingness/effort — the addition of a Creative Commons License (perhaps with some restrictive elements like ShareAlike or NonCommercial, for example). But maximizing openness — by including a CC-BY license — requires the same effort, but more willingness as one is granting users a greater degree of rights (only the right of attribution is required). Once an educator understands the open licensing framework, applying any license is equally trivial with respect to effort.

The situation is similar for digital distribution and file formats. Many credit courses already live in a learning management system like Blackboard, Canvas, or Moodle, so some willingness is required to re-upload those digital resources, in editable file formats, to an open repository under both the mixed and most open scenarios. Maximizing openness requires roughly the same amount of effort — the only difference being the choice of repository (to reach the best audience) and uploading the digital files in a less proprietary format.

For other factors, maximizing openness is not necessarily recommended nor achievable. Creating course materials that adhere to some accessibility standards requires some willingness/effort and understanding at least one standard (such as the W3C). It would require considerably more willingness/effort to make the same materials adhere to all international accessibility/usability standards. Translating materials into multiple languages and writing for multiple cultural contexts is a massive undertaking under both the mixed and most open scenarios. We argue that neither is realistically achievable. The assessment factor requires some willingness/effort under the mixed scenario, as the educator would have to make available assessment descriptions, and possibly rubrics, for other educators to administer. Maximizing openness requires more willingness/effort because assessments would need to be accompanied by answers for self-directed learners. As we mentioned in Step 1, the most open assessment is one that is devoid of creative expression and is limited to self-assessments such as multiple choice, true/false, and matching — making the most open scenario potentially pedagogically undesirable.

Step 3) Skill/knowledge required

As suggested by Step 2, a certain degree of skill and knowledge is required to address each of the factors. Step 3 in our flowchart ([Figure 1](#)) addresses this issue. Again, the skill and effort required is much greater when transitioning complete courses from closed to open (see [Figure 5](#)). This is not to suggest that developing traditional closed courses requires no skill or knowledge; substantial knowledge and skill are

involved, but the focus here is on the additional skill or knowledge needed. The breadth of skills needed to address all these factors can be overwhelming. Transitioning full courses to most OCW will likely require outside expertise from instructional designers, educational technologists, translators, or librarians.

OER Factors	Closed	Mixed	Most Open
Copyright/Open Licensing Frameworks	None	Some knowledge/skill	Some knowledge/skill
Accessibility/Usability Formatting	None	More knowledge/skill	More knowledge/skill
Language	None	More knowledge/skill	More knowledge/skill
Support Costs	None (an awareness problem, skill still needed to pick resources regardless of cost)	Some knowledge/skill	More knowledge/skill
Assessment	None	Some knowledge/skill	More knowledge/skill
Digital Distribution	None	Some knowledge/skill	Some knowledge/skill
File Format	None	Some knowledge/skill	Some knowledge/skill
Cultural Considerations	None	More knowledge/skill	More knowledge/skill

Figure 5: Skill/knowledge for factors in closed, mixed, and most open scenarios.

In the closed scenario, most of the factors are represented by “none” which means no special skill is required. Designing closed courses is simply a responsibility of educators, and while subject knowledge is required (and hopefully accompanied by an understanding of pedagogy) there is no required specific skills or knowledge related to openness. The support costs factor does require an active choice (similar to the Overview of Decision Factors scale in Step 1) because the educator must choose course readings regardless of cost. Digital distribution and file format require no knowledge/skill even though openness is not prioritized in this scenario. Similarly digital distribution requires roughly the same amount of skill under the mixed and most open scenarios. In a completely closed course, resources would most likely exist in print (requiring no digital distribution) or would be uploaded to a learning management system. OER repositories such as MIT OpenCourseWare, OER Commons, or an institutional repository require roughly the same amount of skill/knowledge for uploading files. The skill/knowledge only increases under the mixed and most open scenarios due to the fact that the educator must choose an appropriate open repository to share the work. Furthermore, in order to upload resources to an open repository an educator must be able to choose an appropriate open license (recall Step 1). Here we see the interplay between what each of the OER factors represent and the skill/knowledge required to act.

Language and Cultural Considerations both require more knowledge/skill under the mixed and most open scenarios. As stated earlier, an educator must be able to translate a resource into at least one other language under the mixed and most open scenario. For cultural relevance, the educator must understand the culture(s) enough to choose universally understandable examples and terminology. Both factors require strong technical writing and forethought.

The accessibility/usability formatting factor stands out because it is technically onerous. Even under the mixed scenario, an educator would require some understanding of the visual, auditory, and physical disabilities that prohibit learners from consuming content and participating in learning. Under the most open scenario, educators would need to provide resources in colour and greyscale format. HTML content would include ALT tag descriptions for learners using a screen reader. Videos would be accompanied with closed captions — requiring creation of full transcripts. Similarly, audio files would be accompanied by complete transcripts. Many of the agreed upon accessibility best practices would also need to be considered. From a usability standpoint, resources would be designed with form and function in mind. Web sites would need to include easy-to-understand navigation, breadcrumbs, and visual cues that facilitate interaction with the content. An educator could spend a lifetime studying accessibility and usability

standards.

It is for this reason, that the accessibility/usability is the most likely to require outside assistance. Just as instructional designers, educational technologists, and librarians are experts in creating easily understandable, and well organized, content, these professionals are best equipped to address OCW/OER's many technical challenges. As a result, this accessibility/usability is linked to the support cost factor. A credit course OER project might require the involvement of several stakeholders — thereby driving up development costs. Step 3 highlights the need to consider support costs from two perspectives — 1) the costs of resource development (labour costs) and 2) costs to students. Support costs, even if not requiring monetary resources, do represent an opportunity cost. Time spent developing and maintaining OCW/OER is time otherwise spent on scholarly endeavors, service to the institution, etc. In this respect, support costs are linked to a common barrier to OCW/OER creation which is institutional tenure and promotion requirements.

When considered in totality of defaultness, effort, willingness, and skill/knowledge, it is likely that no single individual is capable of maximizing openness for any particular resource. Educators are better off reflecting on their knowledge, skills, time, effort, and willingness and assessing "what choices can I make that are 'open enough?'"



Limitations and discussion

Openness is open to different interpretations and educators must make their own subjective decisions regarding to what degree of openness they desire. The diverging opinions on what openness really means in an educational context prohibits the creation of a completely objective and representational instrument. Therefore, the lack of precision is a limitation of this paper, and reflects the overall ambiguity in the scholarship on openness. However, we want to emphasize it is not the end product that is most important but the process of visualizing the transformation of a course or resource from closed to open. Each educator will approach OCW/OER with a different set of priorities and goals. Therefore, the conception of "closed" and "most open" will vary, and there are a range of more granular options in between. We are confident in the eight factors as guiding principles, as they are based on scholarship as well as our experiences as OER creators. But, the process of creating each scale and working through the transitional process from closed to open has been an illuminating experience. We also suggest that as OEP evolves new factors may become relevant and existing factors may change with regard to how much effort, willingness, or skill is required to increase openness.

As is self-evident from our scales, maximizing openness for some of the eight factors is neither realistic nor desired. Creating resources that are multilingual and/or are relevant in a variety of cultural contexts is a monumental task. As a result, it is advisable to focus on no more than two languages or cultural contexts. We feel it is more important that educators worldwide are empowered to develop their own OCW/OER, rather than Western nations being the primary developers and exporters of open content.

The copyright/open licensing factor functions best in its most open form. We recommend using the Attribution (CC-BY) license and avoiding restrictive licensing elements. It provides a restriction free license while maintaining full credit to the author. Ideally, resources should be accompanied by the least restrictive open license — whether the educator chooses Creative Commons, the GNU Public License, MIT License, or some other framework. Licenses under the mixed scenario, we argue, provide a false impression of openness, as the ShareAlike, NonCommercial, and No Derivatives elements impede the adaptation and creation of OCW/OER by putting requirements on users beyond attribution.

The explication of the eight factors also de-centers open licensing in considerations of openness. While an open license is still a necessary element of openness, and as such the most important factor, a work with a CC-BY license and all other factors closed is barely open, and we argue not open enough.

Open educators should also consider where decisions in increasing openness create clear pedagogical tradeoffs. Some factors, such as language, support costs, and assessment, highlight this problem. While writing in a simplified manner to facilitate translation may improve openness, it can be more difficult to communicate complex academic concepts in simple sentences. With regard to support costs, the best supplementary readings to support an open course may simply not be available in an open manner. For example, an open sociology course dealing with prominent twentieth century sociological theory may require students to read the works of Giddens and Habermas rather than reading open access journal articles that discuss the writings of these authors. Maximizing openness in assessment may also undermine pedagogy. For example, an essay asking students to contrast the theories of Giddens and Habermas is less open than a true and false and multiple-choice exam on the work of the two theorists. While the objective test is more open than the subjective essay, the latter may be more useful in truly assessing the learner's knowledge of the two theorists.

A critical requirement of OCW/OER is that they are editable, so other educators can repurpose and redistribute resources. Another limitation of this paper is that it does not address the challenges introduced by video content and multimedia. Text content can easily be labeled editable or non-editable, based on its file format. However, it is not clear what is a more or less editable video or audio file format (Chappe and Arias, 2015). Common video formats such as AVI, MP4, MOV, etc. all have positives and negatives with regard to their compatibility. Though, most modern video editing suites will ingest the common format types. In this case, there is no most open file format. Multimedia is more dependent on bit rate and resolution quality. Despite their larger size, uncompressed (or lossless) file formats are preferred for OCW/OER.

Also, for some specialized resources, there may be such high level of knowledge or skill needed to effectively understand and use a resource that, even where the factors we have identified are made more open, practical openness cannot be achieved. For example, an open course on Cauchy-Riemann equations can be made more open by having it available in multiple languages, but educators must also realize the limited audience that could effectively engage and learn from such a course.


The original goal of this paper was to conceptualize a scale that would accommodate a variety of OER types. An educator could use our proposed framework selectively for the evaluation of discrete resources, but ultimately these scales are better suited for evaluating full courses. Because any openly licensed learning object could qualify as an OER, it is difficult to develop more granular factors for analysis. All eight factors are loosely defined out of necessity. File formats, accessibility standards, and digital distribution, for example, are all dependent on the technology available. With the rise of virtual and augmented reality as potential future educational mediums, the criteria by which we judge these factors is likely to change.

Finally, assessment remains a problem with no solution. We firmly argue that, in its most open form, OCW/OER designed with learner self-assessment in mind are pedagogically inferior. Without instructor feedback, essays, long answer, or even short answer assessment methods are impossible because they all contain a level of subjectivity. Until there are significant advances in automated essay grading using machine learning, assessment remains a sticky point.



Future research and conclusion

Given the conceptual nature of this paper, our goal was not to provide a perfect solution but rather to develop a conceptual framework for thinking through the challenges educators might face. Rather than have discourse around open education framed as an “open/closed” dichotomy, we feel that the question of “open enough” is more useful for getting educators to think about opening their work, and what choices can be made to increase openness, particularly given the time constraints educators face. However, in the future we would like to develop an empirical version of these scales to examine their impact on OER projects. We would also like to turn these scales into an interactive resource — preferably a Web site. This would allow educators to highlight the OCW/OER factors relevant to their project, determine their effort/willingness, and their skill/knowledge level in an online environment, to generate an action plan for the project.

As the title of this paper suggests, we — as open educators — need to determine what is open enough. If the goal of OER is to advance accessibility and equity, we need to create realistic expectations for educators undertaking this work. Can we realistically expect resources to be translated into several different languages? Should we be promoting the creation of assessments that only test factual or surface level understanding? Should we expect resources to be made available in every possible file format for the sake of editability? Perhaps, instead, we should be encouraging the creation of high-quality, outcome-focused, and targeted resources that actually have a positive impact on learning. Institutions, funders, and granting agencies supporting OCW/OER projects should also realize the diversity in effort, willingness, and skill/knowledge for various factors. Grants for OCW/OER creation would do best to require those factors most easily addressed by individuals as requirements (e.g., use of CC-BY license) and financially support those factors that are the most labour intensive (e.g., accessible design and multilingual support/offering). We addressed the theories put forward in this paper in the same spirit. There are potentially more than eight factors we could have addressed, but we want to create goal posts so we do not overwhelm educators in their pursuit to become more open. 

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Notes

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2. Lane, 2009, p. 2.
3. Cronin, 2017, p. 16.
4. Knox, 2013, p. 822.
5. Weller, 2014, p. 28.
6. Hegarty, 2015, p. 5.
7. Pierce, 2016, p. 11.
8. Lane and McAndrew, 2010, p. 959–960.
9. Lane, 2009, p. 3.
10. Ehlers, 2011, p. 2.
11. Paskevicius, 2017, p. 127.
12. Both authors have been involved in the creation of OER, including the development of pilot OER on copyright for the University of Alberta. Both are frequent contributors to their respective institutional repositories, and McNally developed an OCW course.
13. Krug, 2014, p. 155.

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Open enough? Eight factors to consider when transitioning from closed to open resources and courses: A conceptual framework

by Michael B. McNally and Erik G. Christiansen.

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