

CHAPTER 12

# Open Universal Design for Learning:

## Working to Make Open Educational Resources Equitable and Accessible

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### Introduction

Universal Design for Learning (UDL) is having a larger presence in the pedagogy of librarians who teach information literacy. However, while themes of accessibility have gained strong traction in the conversations around information literacy, the application of accessible pedagogical approaches, such as UDL, has yet to have a large presence in the open educational resource (OER) literature, even though the principles of UDL and open access practices are closely aligned. According to the Scholarly Publishing and Academic Resources Coalition, commonly known as SPARC, open access (OA) is defined as the “free, immediate, online availability of research articles coupled with the rights to use these articles fully in the digital environment.”<sup>1</sup> OERs are closely related to the OA movement, as they are freely available and openly licensed classroom materials including textbooks, slides, full courses, activities, and more.



The number of students with disabilities in higher education is on the rise, with many instructors and librarians working with these students in their classrooms.<sup>2</sup> There is a rising need to create equitable learning experiences for not only students with disabilities but also for all students and the diverse experiences they bring to the classroom. Everyone learns and works with materials differently, and incorporating UDL into classroom resources can help bridge inaccessible gaps for students. Therefore, the partnership of UDL and OER has implications for both the implementation of OER in the classroom and the dissemination of OER across open access platforms to make both finding and using them easier for all.

Within the library field, libraries and librarians have often been at the forefront of the OER/OA movements by providing grants to incentivize instructors to build OERs, creating OA repositories, and designing positions such as OER Librarians or Digital Scholarship Librarians who focus specifically on these movements. However, are we encouraging faculty to incorporate inclusive and accessible pedagogies into these resources? We should, since implementing UDL practices into OER work aligns easily, like the missing piece of a puzzle.

This chapter explores two major implications for the application of UDL in OER: OER in the classroom and the management of OER in open access repositories. We will discuss the practical implications of UDL for open access and open pedagogy as it relates to OERs. The core themes of UDL—multiple means of engagement, representation, and action and expression—can be applied to the practices of open pedagogy, such as the co-creation of OER with students. We also discuss UDL's implications for OER's technical management, including open licensing, increasing OER accessibility through platform affordances, and support for the iterative approach to OER creation that can be facilitated by OER repositories. Open pedagogy and UDL are two principles that offer a perfect marriage of ideas, both working to foster an inclusive and accessible classroom. Librarians are in the perfect position to implement the marriage of these ideas in practical and meaningful ways.

## UDL and OER

The integration of UDL into OER is something that should be common practice. Often, the instructors who are incorporating OER into their classroom are already looking to make it more inclusive for students. As Abbey Elder has stated, “Accessibility is one of the things that will determine the usability of an OER for learners with diverse needs.”<sup>3</sup> One of the best ways to incorporate accessibility into OER is by incorporating UDL into that resource, too. Fortunately, a lot of the principles within UDL fit within the principles of OER (table 12.1), allowing for easy implementation of UDL into the creation of OER.

**Table 12.1.** How the principles within UDL fit within the principles of OER. (Chart adapted from Peter and Clement, Universal Design for Learning and Library Instruction Charts.)

Universal Design for Learning Principles	Universal Design for Learning Example	Open Educational Resources Example
Multiple Means of Engagement: Options for Recruiting Interest: Minimize threats and distractions. 7.3	Create a safe space for the students that helps them avoid having a negative and/or distracting experience.	Providing students with free and accessible textbooks or course materials removes a harmful barrier for students struggling to avoid the cost of textbooks or not purchasing the book because of cost.
Multiple Means of Representation: Provide Options for Perception. Offer ways of customizing the display of information. 1.1	Digital materials provide more flexibility in displaying information that is static in traditional print.	OER are often online resources that provide alternative methods to print the resource (e.g., OpenStax you can print for cheap) if that is a student's preferred method. Providing that option allows students to interact with the content how they choose.
Multiple Means of Action and Expression: Options for Physical Action: Optimize Access to Tools and Assistive Technologies 4.2	Consider using a variety of tools and methods that make the content physically accessible for all students.	The flexibility that OER provides allows instructors to implement a variety of tools.

At the most basic level, you could start implementing UDL by just switching to an OER textbook, which allows students to choose a digital or a print version, creating alternative means of representation. This can also remove the struggle of needing a textbook accommodation with a traditional textbook. For example, a student with a visual impairment may need an audio version of a physical book or a student may prefer working with a physical copy of a textbook to make highlights and notes to themselves. OER are often available online but also available to be printed or purchased at a much lower cost. These benefits of OER can be important for instructors to know and understand when making the choice of open.

Librarians know all too well that it can be difficult to encourage instructors to incorporate inclusive practices into the OER that they create. However, there are helpful tools and resources that librarians can use to support the design of inclusive OER, such as UDL On Campus, a subset of CAST, an organization that works to promote and support UDL in higher education.<sup>4</sup> UDL On Campus has posted a set of seven key factors for implementing UDL into OER and creating accessible OER.<sup>5</sup> Below you can find the seven key factors along with examples of how we as librarians can utilize these ideals to support faculty.

**Table 12.2.** Seven factors for creating accessible OER and librarian support

Factor	Description	Librarian Support
Metadata: Locating Accessible Content	Finding open content that is accessible from the beginning.	Advising on metadata within OERs, repositories or host OER, and where to find accessible OERs.
Accessibility/Universal Design for Learning	Applying Universal Design for Learning concepts to the creation of OER allows for materials to be more accessible from the beginning.	Host workshops and provide instructional materials to faculty interested in designing OER about Universal Design for Learning and accessibility.
Standards/Course Alignment	Confirm that the instructional materials you are including fit within the course framework or standards.	Identify and share tools like OpenStax or OER Commons that provide information about the different learning objectives or standards used by the OERs, so that faculty can better judge how the OERs meet their curricular needs.
Check for Bias	All content included in OER should be free from “bias in religion, ethnicity, race, and sexual orientation.” <sup>6</sup>	Encourage faculty to be aware of bias in resources they are adapting and to be as inclusive as possible when creating their own.
Efficacy Based Research	Consider if these resources have been proven to be effective for students.	Encourage the incorporation of open pedagogy and student involvement into the creation of instructional materials.
Assessments	Various levels of assessment are incorporated.	Encourage faculty to survey students on whether the instructional materials are helpful for student learning.

These seven factors work to support accessibility as a whole by building in consideration of whether the OER is accessible as part of the OER adoption and creation processes. They also support UDL, since bringing these considerations in at the beginning supports the UDL philosophy of “address[ing] these needs from the outset, to avoid, to the greatest extent possible, the need for ad hoc retrofitting.”<sup>7</sup> Additionally, BCcampus’ *Accessibility Toolkit*<sup>8</sup> and Abbey Elder’s *OER Starter Kit*<sup>9</sup> both mention OER and UDL. Pointing instructors to these resources can help support them in their move to OER by making it inclusive and accessible as well.

Incorporating UDL into the creation, adaption, and adoption of OER is an important step to make the classroom and resources accessible for all students. UDL and OER frameworks work together to create a more accessible learning environment while also removing barriers

to accommodations. As librarians, if we work to promote this integration from the beginning, faculty can create a more inclusive environment and adopt more inclusive pedagogies.

## UDL, Open Pedagogy, and Critical Open Pedagogy

When integrating a pedagogical practice within OER, open pedagogy is a natural fit. According to BCcampus, open pedagogy requires the consideration of two parts: open and pedagogy. “Open” indicates that all materials are licensed in a manner that makes them freely accessible to all. “Pedagogy” considers not *what* we teach but rather *how* we teach.<sup>10</sup> Often, this involves bringing students into the design of OER resources. One common example of open pedagogy is to have students annotate an OER textbook and use those annotations as part of the book. Another example of open pedagogy involves students helping to create the teaching materials that are published openly. There are many different sizes and shapes that open pedagogy can take.

Taking the concept of open pedagogy a step further is critical open pedagogy. Critical pedagogy considers issues of power within the classroom and works to encourage students’ knowledge of marginalized voices.<sup>11</sup> Critical open pedagogy works to address these issues of power in the classroom and OER. Rajiv Jhangiani says that critical conversations often happen in the margins of larger conversations.<sup>12</sup> The same can be said for conversations about accessibility in OER and open pedagogy. Accessibility is often a minor, though active consideration in the conversation about open pedagogy, but it is rarely seen as a topic important enough to warrant its own critical conversation. Through open pedagogy, professors can bring students into the conversation by having them design materials, edit materials, review materials, and more. Critical open pedagogy works to bring the students in but also considers those elements of power, like the accessibility of textbooks, which can impact the learning of students with disabilities. Jhangiani argues, “I think there’s a lot of discussions about access that simply ignores, forgets, dismisses questions of accessibility.”<sup>13</sup> The idea of critical pedagogy is not new within the library field, with numerous articles and book chapters considering how librarians can incorporate this into library instruction, but what is unique to Jhangiani’s approach is that he focuses specifically on accessibility. This emphasis on removing the barriers for disabled students is important as US Census data shows one in ten people live with a disability.<sup>14</sup> Additionally, the student populations enrolled in colleges and universities continue to become more diverse, including a rising number of students who identify as having a disability.<sup>15</sup> Considering information literacy’s emphasis on accessibility, librarians and instructors should be considering UDL in our open pedagogy work, removing barriers for all.

## UDL, OER, and Open Pedagogy in Practice

Within UDL, many of the principles perfectly align with many examples of open pedagogy. Table 12.3 shows side-by-side examples where open pedagogy and UDL mirror each other.<sup>16</sup>

**Table 12.3.** Examples where open pedagogy and UDL mirror each other. (Chart adapted from Peter and Clement, Universal Design for Learning and Library Instruction Charts.)

<b>Universal Design for Learning Checkpoints</b>	<b>Open Pedagogy Example</b>
Multiple Means of Engagement: Options for Recruiting Interest: Optimize Individual Choice & Autonomy (7.1)	When considering a perceived challenge, you can build in options for how students interact with an OER textbook. This could include allowing students to annotate, edit, or write examples for the textbook.
Multiple Means of Representation: Options for Language and Symbols: Clarify syntax and structure. (2.2)	Have students work to supply alternative examples using their personal experiences that can be built into the textbook. That content could be written, audio, visual, or all three.
Multiple Means of Action and Expression: Options for Expression and Communication: Build fluencies with graduated levels of support for practice and performance. (5.3)	Build scaffolding into your open pedagogy assignment. This could start with students viewing past examples, submitting an idea, submitting a draft, peer review, and more. Scaffolding is a critical part of open pedagogy as the work students produce is published openly.
Multiple Means of Action and Expression: Physical Action: Vary the methods for response and navigation. (4.1)	Allow students to add comments to an OER resource, utilizing tools like Pressbooks, of their own experiences and opinions. Make sure they can express this in different ways, such as “hand, voice, single switch, joystick, keyboard, or adapted keyboard.” <sup>17</sup>

The examples within the chart are but a few ways that you can incorporate both UDL and open pedagogy. By applying these pedagogies, instructors can work to shift their focus from access to accessibility—a critical shift, according to OER advocates such as Jhiangiani.<sup>18</sup> By incorporating OER and open pedagogy, professors make their classroom materials more accessible. Bringing UDL into the mix allows the content to truly be accessible for all. As Yang Wu and Matthew Boyer argue, “OER development is increasingly moving towards supporting the needs of diverse learners and creating materials that are more culturally inclusive.”<sup>19</sup> Instructors need to further support that effort of supporting diverse needs by bringing in a tool like UDL that allows resources to be accessible to all users. We, as librarians, can work to encourage instructors who are considering OER and open pedagogy by providing workshops for faculty related to these topics and encouraging resources to support faculty in accessible design.

## OER and Institutional Repositories

An institutional repository (IR) hosted by a college or university is one of the most common access points for OER users, adopters, and creators.<sup>20</sup> As a platform for digital content, IRs have become a natural home for openly licensed educational materials and ancillary curricular content such as quiz banks, presentations, labs, and more. While

there are a number of large OER repositories that house material from across the United States, the emergence of institutional OER grant programs has propelled the deposit of OER materials into local IRs.<sup>21</sup>

IRs and the principles of UDL align in many ways that support open and equitable access to content. IRs can host a variety of file types and versions of a digital record, allowing for multi-modal access to a learning object. Additionally, an OER hosted on an IR can be widely accessed for adoption or adaptation with references to the original content through persistent links. However, IRs can also be a barrier to accessing information. Roadblocks, such as incomplete or inconsistent metadata, not providing or supporting accessible file types, and incomplete preservation policies or lack of support for repository services, can prevent users from finding and utilizing hosted content.

Finding and accessing OER in IRs has been a historical issue and, despite advancements in digital collection platforms and services, continues to present an obstacle for OER creators, users, and managers.<sup>22</sup> There is no centralized OER repository, so the management of OER content is left up to each repository team and, depending on the resources of the team, the collection and preservation of this content can vary greatly. OER repositories are only as advanced as the organizations and practitioners who manage them and the technical affordances of the platforms themselves. This disparity creates inequality between organizations that have IRs with multimedia capabilities, a dedicated repositories staff, and digital collections and metadata knowledge, and those who do not. For example, in a 2021 survey, nearly 46 percent of 103 respondents indicated that they had taught themselves how to publish OER content.<sup>23</sup> This illustrates how few libraries have IR experts to help with OER publishing. Additionally, in a 2020 survey on institutional repositories, lack of staffing and finances were ranked as the highest barrier to accessibility in IRs, followed by lack of expertise.<sup>24</sup>

The OER repositories and IRs that house openly sourced educational materials are a crucial component of not only sharing OER but also in the further development of the resource by OER creators and adopters. Both the principles of OER and UDL support the widest possible use of the content by the widest range of users. Therefore, incorporating a few key web accessibility techniques and metadata standards can help break down technological barriers to OER adoption.

#### UDL and IRs in Practice

In an ideal world, incorporating web accessibility considerations and open formats would not be an additional burden on OER creators and content managers but rather a natural extension of the 5Rs of OER: retain, revise, remix, reuse, and redistribute.<sup>25</sup> The principles of UDL and the 5Rs of OER work together in a few important ways during the OER's submission and preservation phase. When OER is ingested into a repository, there are three opportunities for applying accessibility techniques that align with the UDL framework:

- OER file types and preservation
- OER licenses
- OER metadata

## *OER File Types and Preservation*

OER that integrate UDL guidelines 1 and 2, “Perception” and “Language and Symbols,” often incorporate multiple types of files, such as audio and visual files, interactive files, and sometimes web captures or links, in order to provide learners with multiple means of accessing the information through representing concepts visually, auditorily, and through multiple media. The variety of files can prove challenging in an IR both in terms of accessibility and preservation.

Steven Ovadia’s 2019 article, “Addressing the Technical Challenges of Open Educational Resources,” has many practical tips for utilizing open file formats to increase access to OER content and ensuring preservation of the content. One tip is to encourage the upload of a plain text file or an OpenDocument file either alone or along with a formatted document as well as any raw video or audio files.<sup>26</sup> Raw files not only help OER creators build upon existing content by allowing them to more easily remix content, but keeping the original formatting also helps with the preservation of the content. Instead of tracking down content from a broken link or trying to open a file on proprietary software, using the repository to store a local file of the raw and unformatted content can ensure long-term access.

If an IR doesn’t already have a preservation workflow, incorporating OER into the digital collection is a good opportunity to start thinking about the long-term management of these digital materials. In Sarah Hare and Madison Sullivan’s 2020 article, “A Qualitative Study on the Digital Preservation of OER,” they suggest developing a workflow that helps to communicate the preservation capacity of the IR and the expectations of OER creators, including accepted file types, tools, and sharing requirements.<sup>27</sup> Communicating the value of preservation and the technical requirements, including accessibility requirements, will enable long-term access to OER and will help prepare OER creators at the beginning of the process to make for a more sustainable resource.

## *OER Licenses*

A crucial component of an OER is its open license. This is what allows the resource to be adopted and adapted. The license clearly states the sets of permissions granted by the creator to others, including whether they have the right to reuse, revise, remix, redistribute, and/or retain OER content.<sup>28</sup> Open licenses allow for OER creators, accessibility experts, and UDL experts to come together to continue to build upon openly licensed educational resources. It helps to support the UDL principle of providing multiple means of representation. For example, an instructor using OER can incorporate checkpoints 3.3 and 3.4 by adapting examples from an existing OER to better fit their learners and the specific contexts in their learning environment. An open license allows both the learners and the instructors permissions to play with the materials in a way that best suits their preferred means of engagement and learning objectives.

## *OER Metadata*

Metadata fields that describe an OER record are an important component of OER in IRs. Metadata, or the description of the OER in the IR, enhances the searchability and visibility



of the open resource. Metadata of OER is not standardized and varies widely, which means searching for a specific set of resources can prove challenging, especially when searching across multiple OER repositories.<sup>29</sup> Therefore, developing a guide or an institutional workflow for describing an OER resource to maintain consistency and a high level of description would be beneficial. The guide can also incorporate instructions for how to describe an OER that incorporates UDL and other accessibility features. One resource suggested by CAST is the Accessibility Metadata Project hosted by the W3C Community and Business Groups.<sup>30</sup> The *Accessibility Toolkit* recommends including an accessibility statement in the OER to clearly identify the accessibility features and the specific users the resource has been designed for.<sup>31</sup> An accessibility statement and other documentation concerning the creation of the resource could go into a ReadMe file attached to the OER. Hare and Madison recommend attaching ReadMe files to OER to improve OER metadata and to document the creation of the OER and its educational context. This would also be a perfect place to document the use of the UDL framework in an OER.

When we consider the repository as an entry point and critically evaluate the barriers to entry for accessing OER, we can better identify the roadblocks that stand between creators, users, and content. Applying UDL principles to OER in institutional repositories is one way of removing those roadblocks. While we are often inhibited by what the repository platform affords technical administrators, depositors, and users, UDL principles can help repository managers, library staff, and OER creators utilize platform functions and metadata standards to enhance accessibility until new platforms and techniques can be developed. If OER advocates incorporate the factors of UDL in IRs, they are both helping to solve the technical issues of supporting OER content in the institutional repository and widening the access to the content by adopting technical accessibility standards.

The fundamental elements of IRs, including metadata and technical infrastructures, which support the increased visibility and usability of the OERs they contain, cannot be incorporated into metadata and repository management tasks without the support for that labor and the time allowed for the cultivation of those skills. The people behind these systems cannot be forgotten as an essential part of this infrastructure. Progress will be difficult, if not impossible, if repository managers and staff are not able to invest time into the management of OER collections.

## Resources for UDL and OER

In OER, technical and pedagogical accessibility go hand in hand. OER initiatives should ideally “bake in” UDL principles that promote technical and pedagogical accessibility principles. This requires that the relevant librarian or staff member and OER creator work together to communicate and strategize before OER creation. To prevent this work from being an additional barrier to OER adoption, instructors should develop a strategic plan or toolkit. The good news is, there is no need to reinvent the wheel! Accessibility advocates in the libraries and technology have created resources and support networks. The SPARC Libraries & OER Forum,<sup>32</sup> in particular, is a great resource for finding best practices when it comes to OER creation and management with regular contributions of support and resources from OER experts Cheryl Cullier Casey, Abbey Elder, and Amy Hofer. Another

valuable resource is BCcampus, which has published an *Accessibility Toolkit* from authors Amanda Coolidge, Sue Doner, and Tara Robertson.<sup>33</sup> The toolkit incorporates both principles from Universal Design and the Web Content Accessibility Guidelines (WCAG) with the goal “to provide the resources needed for each content creator, instructional designer, educational technologist, librarian, administrator, and teaching assistant to create a truly open and accessible textbook—one that is free and accessible for all students.”<sup>34</sup> Additionally, accessibility advocates, such as Katie Manwiller,<sup>35</sup> Amanda Page, Dr. Katherine Deibel,<sup>36</sup> and Cynthia Ng,<sup>37</sup> have written on, spoken about, and created resources that are useful for both the novice and the expert repository manager and OER creator.

## Conclusion

By incorporating OER into the digital collections, the institutional repository and the repository service team members that manage it have an opportunity to shift from a service-based model to a collaborative one. An OER collection in an institutional repository can become a space for engagement across the campus rather than a stagnant resting place for institutional content and can illustrate value of the IR to the institution to help advocate for continued (and perhaps expanded) support for repository services.

Applying the principles of UDL to OER in the classroom and in repositories helps to provide a practical example of how the technical and ethical aspects of UDL can work in academic libraries. UDL can be used to drive purposeful work in both open practices and open infrastructures in meaningful ways. All levels of instructional support, from librarians to instructional designers, and repository managers, can begin to take the steps to incorporate the principles of UDL and open education resources and work toward the pedagogical and technical equity that will help to support learners and educators.

## Notes

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