Fostering Diversity, Equity, and Inclusion by Adopting Universal Design for Learning Principles in Academic Libraries

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Abstract

This paper draws together research on Universal Design for Learning (UDL) and showcases practical guidelines for academic library services.

First, this article introduces UDL and summarizes the three core principles of UDL, which are 1) engagement, 2) representation, and 3) action and expression. We then address the misperception between UDL, accessibility, and assistive technology. We describe the most important US laws and legal references supporting diversity, equity, inclusion, and access in academic libraries and higher education. UDL is such a multifaceted framework, hence we will not address all areas academic libraries can adopt it into their work practice. Instead, this article will focus on public services comprised of access, reference, and instruction. We also provide *Online References*, and *Further Recommended Readings* as an aid for readers. The motivation behind this article is to encourage awareness of UDL and, as such, increase equity, diversity, and inclusion to be an academic library for all kinds of students and patrons.

Keywords: Academic Libraries, Accessibility, Access, Assistive Technology, Access Services, Diversity, Equity, Inclusion, Information Literacy, Instruction, Higher Education, Librarianship, Reference Service, Technology, Universal Design, Universal Design for Learning.

Table of Contents

Introduction

Academic libraries offer resources and services that deliver knowledge and ongoing training in established and emerging technologies for students. Each student in a college community has unique learning and research needs. Students with specific needs require assistive and/or accessible tools and services from a college's Student Disabilities Services Office. They need to register for the services officially as "the percentage of undergraduates who reported having a disability was 11 percent for both males and females" (*The NCES Fast Facts Tool Provides Quick Answers to Many Education Questions (National Center for Education Statistics)*, n.d.).Not to overlook students who have naturally occurring conditions, for example, using eyeglasses or contact lenses for decreased vision.

Academic librarians and libraries in the United States hold up the Association of College & Research Libraries (ACRL) core commitment in "creating diverse and inclusive communities in the Association and academic and research libraries. [...] The Association will acknowledge and address historical racial inequities; challenge oppressive systems within academic libraries; value different ways of knowing; and identify and work to eliminate barriers to equitable services, spaces, resources, and scholarship" (*ACRL Plan for Excellence*, 2011, sec. Core Commitment)

The American Library Association's Services to Persons with Disabilities: An Interpretation of the Library Bill of Rights emphasizes that "Access to materials should not be restricted by any presuppositions about information needs, interests, or capacity for understanding. Library staff should actively research and integrate existing and emerging accessible technologies and provide services to assist patrons when conflicts

exist. The availability of these technologies and services should be marketed and available to all patrons. When libraries present information in formats that are accessible to all users and do not limit access to physical facilities or virtual library structures, they eliminate barriers to information" (The American Library Association, 2009, sec. 1. para.5).

The Universal Design for Learning (UDL) framework explores accessibility, assistive technology, attitudinal barriers, collaboration, equity, and proactively adjusting your teaching. An environment that uses a UDL approach embraces traditional and emerging teaching methods and tools to provide a holistic learning experience for as many students as possible. Nurturing diversity, equity, and inclusion by adopting UDL in academic libraries certainly is no panacea. However, it will help raise awareness and advocacy and thus ensure that libraries and their resources and services are available for all. UDL implementation provides an alternative view for learners of all ages and includes principles of pedagogy and andragogy.

Universal Design for Learning

The principles of UDL were developed following the 1997 reauthorization of the Individuals with Disabilities Education Act (IDEA) (Edyburn, 2010, p. 33). UDL is based on Universal Design (UD), an architectural conceptual design methodology established in 1997 including user-friendly, flexible, and practical design, tools, and space for people

(*What Is Universal Design | Centre for Excellence in Universal Design*, n.d.). On the other hand, it is built upon "recent advances in the cognitive sciences, and especially in the cognitive Neurosciences, [which] have made one thing abundantly clear—there is no simple way to characterize, or localize, cognition. The journal Cognitive Psychology takes a typical approach to this problem: instead of directly defining cognition, it lists related processes: memory, language processing, perception, problem solving, and thinking" (Rose & Strangman, 2007, p. 382).

The **UDL** guidelines are comprised of three principles which are 1) engagement, 2) representation, and 3) action and expression:

1) **The multiple means of engagement principle** (*the why of learning)* conveys that learners interact, engage, and motivate differently in social and academic contexts due to individual experiences with “neurology, culture, personal relevance, subjectivity, and background knowledge. Some learners are highly engaged by spontaneity and novelty, while others are disengaged, even frightened, by those aspects, preferring strict routine. Some learners might like to work alone, while others prefer to work with their peers” (*UDL: Engagement*, n.d., para. 1).
2) **The multiple means of representation** principle *(the what of learning)* shows that learners learn and understand in different ways as "those with sensory disabilities (e.g., blindness or deafness); learning disabilities (e.g., dyslexia); language or cultural differences, and so forth may all require different ways of approaching content. Others may simply grasp information quicker or more

efficiently through visual or auditory means rather than printed text" (*UDL: Representation*, n.d., para. 1).

3) **The multiple means of action and expression principle** (*the how of learning*) explains that learners navigate, approach, and express themselves in different ways as "individuals with significant movement impairments (e.g., cerebral palsy), those who struggle with strategic and organizational abilities (executive function disorders), those who have language barriers, and so forth approach learning tasks very differently. Some may be able to express themselves well in written text but not speech, and vice versa" (*UDL: Action & Expression*, n.d., para. 1)

Nelson et al. clarify that "UDL is a framework versus a curriculum, teachers are in full control when designing the learning environment and lessons" (Nelson et al., 2013, p. 4). Any environment that uses a UDL approach embraces traditional and emerging teaching methods and tools to provide a holistic learning experience for as many students as possible. Embracing diversity, equity, inclusiveness, and access by adopting a UDL mindset is vital for all learners and not only those with apparent differences. As such, an UDL mindset/sensibility benefits many students, including English as Second Language (ESL), non-traditional (adult, GED, veterans), neurodiverse students, Black, Indigenous, People of Color (BICOP) as well as other underrepresented minorities.

Does UDL equal Digital Accessibility, Accessibility Technology, Assistive Technology?

To be clear, UDL is not digital accessibility, accessibility technology, nor assistive technology. However, "some individuals may see AT [assistive technology] and UDL as identical, or conversely, antithetical. We believe that neither view is accurate but instead that AT and UDL, while different, are completely complementary—much like two sides of the same coin" (Rose et al., 2005, p. 507). Yet, it is important that the two sides of these coins "these two fields develop symbiotically. When UDL and AT are designed to co-exist, learning for all individuals is enhanced" (Rose et al., 2005, p. 517). Digital accessibility, accessibility technology, assistive technology, and UDL have as a goal to reduce barriers — assistive technology provides an individual view of learning by increasing or maintaining the functional capabilities of specific students. At the same time, UDL focuses on the whole learning environment so more students can benefit. However, we want to emphasize that "their primary goals are compatible and are widely acknowledged as crucial to ensuring equity in education" (Ableser & Moore, 2018, sec. Introduction, para.1).

Nevertheless, as UDL is a very flexible framework, it can be used without any technology, excluding a student's personal assistive technology. King-Sears cautiously states, "UDL is not defined by or confined to technology. The technology must be combined with an effective pedagogy, which can either stand alone as UDL or stand with the technology" (2009, p. 201). Creamer agrees as UDL is not done by adapting by "expensive technology or drastic changes in teaching practices, but rather through a

simple change in perspective; it changes the way we perceive and interpret learner differences" (p.15).

Diversity, Equity, Inclusion, and Access:

Legal References in the United States

In theory, various laws, policies, and legal regulations support diversity, equity, inclusion, and access (digital, web, and physical). Unfortunately, the reality is often a stark difference as the following two examples highlight:

"In the complaint, the University of Montana was accused of using electronic class assignments, library databases, videos, course registration materials, and other technologies that were not accessible to visually impaired students" (*U. of Montana Improving Access for Disabled*, n.d.)

"The issue of accessibility came dramatically to the attention of higher education in 2015 when the National Association of the Deaf (NAD) filed lawsuits against Harvard and MIT, alleging discrimination against deaf and hard-of-hearing students because content provided free through the edX platform was not adequately captioned" (*From Accommodation to Accessibility*, n.d., sec. Legal Action on Accessibility).

We are by no means legal experts, but we believe being familiar with some legal references helps put UDL in a broader context. We will provide an overview in chronological order, starting with the most recent reference.

- President Biden signed in **June 2021 the Executive Order 14035: *Diversity, Equity, Inclusion, and Accessibility (DEIA) in the Federal Workplace***. *Section* 2 Definition explains "(b) The term “diversity” means the practice of including the many communities, identities, races, ethnicities, backgrounds, abilities, cultures, and beliefs of the American people, including underserved communities. (c) The term “equity” means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment. (d) The term “inclusion” means the recognition, appreciation, and use of the talents and skills of employees of all backgrounds. (e) The term “accessibility” means the design, construction, development, and maintenance of facilities, information and communication technology, programs, and services so that all people, including people with disabilities, can fully and independently use them" (*Diversity, Equity, Inclusion, and Accessibility in the Federal Workforce*, 2021, sec. 2. Definitions)
- **Section 508 Refresh** went into effect on **January 18, 2018,** and **"**Higher education should now be on notice: Anyone with an Internet connection can now file a complaint or civil lawsuit, not just students with disabilities. Moreover, though Section 508 was previously unclear as to the expectations for accessibility, the updated requirements add specific web standards to adhere to — specifically, the

Web Content Accessibility Guidelines (WCAG) 2.0 level AA developed by the World Wide Web Consortium (W3C)" (LaGrow, 2017, sec. Accessibility Issues at the Forefront).

- The **Technology, Equality, and Accessibility in College and Higher Education Act** (TEACH Act) was introduced in the House of Representatives in **2013.** Directing the Access Board "to develop accessibility guidelines for electronic instructional materials and related information technologies in institutions of higher education (IHEs)" (Petri, 2014, para. 1). The TEACH Act was developed for access to the blind and disabled and to be consistent with national and international accessibility standards for those materials and technologies.
- **Higher Education Opportunity Act (HEOA)** 2008 - (PL 110-315) - was enacted on **August 14, 2008**, reauthorizing the Higher Education Act (HEA) of 1965. HEOA of 2008 strengthens financial ability to serve the academic needs of such students. to provide disabled students with a quality higher education (Miller, 2008).
    - UDL-centered teaching is a framework for course design defined in the HEOA of 2008. “The act endorses not only teaching about UDL but teaching in a UDL way” (Novak & Thibodeau, 2016, p. 20).
- **Section 508 of the Rehabilitation Act of 1973 was amended in 1998** to enforce that Federal Agencies make their electronic and information technology accessible to people with disabilities.
- **In 1990 the Americans with Disabilities Act (ADA) was signed into law:**
    - **Title II** regulates state and local government and "Prohibits discrimination

based on disability in all public entities, including public colleges and universities, regardless of whether they receive federal funding” (*UDL On Campus: Legal Obligations for Accessibility*, n.d., sec. LEGAL OBLIGATIONS UNDER SECTION 504 AND THE ADA).

    - **Title III of the ADA Act** prohibits discrimination where public accommodations are provided, such as a private postsecondary institution where courses, exams, and licensing are given, as well as in facilities such as "A museum, library, gallery, or other places of public display or collection”(*Americans with Disabilities Act: Title III Regulations*, n.d., p. 32).

- The **Individuals with Disabilities Education Act (IDEA)** was passed in **1975** which "stated that students with disabilities would be more successful by 'ensuring their access in the general curriculum…'(20 USC § 1400 (c)(5) (a)(1997)" (Zhong, 2012, p. 34).
- **Section 504 of the Rehabilitation Act of 1973** explains that a person with a disability cannot be excluded from a program or activity receiving federal funding, including "a college, university, or other postsecondary institution, or a public system of higher education" (*Section 504, Rehabilitation Act of 1973* | *U.S. Department of Labor*, n.d.)

Literature Review

This literature review looks at UDL in academic libraries, focusing on recent literature that connects the guidelines to diversity, equity, inclusion, and access.
In *Appendix B: Further Recommended Readings* resources to public and other libraries are included.

Peacock & Vecchione (2020) investigate in their article *Accessibility Best Practices, Procedures, and Policies in Northwest United States Academic Libraries* whether or how accessibilities are taken into account when acquiring new collection materials. The authors introduce the UDL framework as it " provides a guide for the creation of instructional materials that can be used by every student equally, regardless of disclosure of disability (Gordon et al., 2016). In short, all materials provided to students should meet accessibility guidelines set by groups such as the American Foundation for the Blind (AFB), National Association of the Deaf (NAD), and WCAG 2.0" (p. 2). The research methodology used by the authors is of particular importance as it is the only one that conducts an (albeit very small) survey among deciding library workers in collections and acquisitions departments. The result of the study shows that so far, the UDL framework is a known concept, yet not widely adopted as standard guidelines for the acquisition department. Therefore the accessibility of purchased content (multimedia, online via streaming services) is not considered as much as it should be. To aid this problem, Peacock & Vecchione "created the "Library Model of Adopting Accessible Practices in Acquisitions" as a way for libraries to identify their organization

along a pathway, and look forward to continually improve their expertise, services, and adoption of UDL" (p. 5). In conclusion, we hope this model will garner wide attention and thus will be adopted by academic libraries throughout the entire USA and internationally.

Even though **Thompson & Copeland (2020)** article's primary focus is on LIS education, we included it here to bring forth a new concept: Diversity by Design. The "Diversity by Design framework [is when the], inclusion in the LIS educational setting takes on layers of integration deeper than simply offering a single elective course entitled 'Diversity and Inclusion in Public Libraries,' for example" (p. 63). The authors describe how this can be achieved by incorporating the Diversity by Design framework throughout their course design, including andragogy, content, communication, and assessment. UDL is first mentioned in the content section as it "ensures equitable opportunities to access and engage in learning on multiple and meaningful levels by ensuring a variety of modes of representation, action, expression, and engagement" (p. 68). As other authors mentioned in this literature review, Thompson & Copeland provide a succinct yet appropriate overview of how to aid the UDL principle of representation by providing different perceptions to students. Furthermore, the authors describe the differences between accessibility and usability as they state, "When approaching course design and implementation, it is especially significant to be mindful of the distinction between accessibility and usability […] few examples of accessibility and usability standards in online courses might include ensuring that Optical Character Recognition (OCR) has

been performed on scanned PDF files before being distributed; confirming that PDF files are accessible or accompanied by their Word document equivalent or linked to the HTML equivalent; and ensuring that all documents (Word, Excel, PowerPoint, etc.) are accessible and usable by screen readers and that there are alternative means of accessing information" (2020, p. 69). In conclusion, we recommend reading this article as it links UDL to the broader concept of diversity, equity, inclusion, and access.

Fong et al. (2017) article is helpful as a primer for anyone not familiar with how Universal Design, Universal Design for Learning, and its closely related theme accessibility are applicable and applied in higher education and academic libraries. They point out that higher education diversity, equity, inclusion, and access "Strategies in both accessibility and UD have made keeping up with technology and policy changes more feasible for many organizations. Legal standards often drive accreditation standards, to which many institutions must adhere" (Fong et al., 2017, sec. Basis for Current Interest). It is no surprise that the authors give a brief overview of how UD and UDL have been applied by academic libraries, mostly in instruction — given that UDL was initially designed for semester setting/discipline teachers. The best feature of the article is its concise practice guide for text-based documents, communications, multimedia, and additional recommended tools. Moreover, potential values and hurdles in adopting UD and UDL within academic libraries will significantly help the novice. The only critique about this article is that Fong et al.; do not distinguish enough between UD and UDL, which, although interrelated, are also distinctly different.

Nall (2015) article is also a concise introduction to UDL and academic libraries. While he acknowledges that UDL's primary usage is in the classroom, he points out that libraries and librarians already (sometimes unknowingly) embrace UDL. Here he highlights how the UDL's principle representation should always include the library building itself, signage in the library should use dyslexia-friendly fonts, and directional information should be available in multiple formats. Moreover, Nall recommends aligning the UDL principle of representation to reference services. Reference should be available via different communication channels, such as virtual chat, in-person, phone, text, and live – video, as well as provide "A quiet, low distraction space away from the reference desk is needed for patrons with attention difficulties or for when the desk area is busy and noisy" (Nall, 2015, p. 375). We agree and will address this phenome in the **reference service section** of this article. Nall's last recommendation in adopting UDL is information literacy instruction. Library instruction sessions should be supplemented with worksheets, conducted at a slower pace, and new concepts should be practiced and repeated. If videos are used, they should always be closed captioned. Further, Nall suggests that the library's web presence must be as "inclusive as possible" (p. 375) and "common language should be used in favor of library jargon" (p. 375). This provides equitable access and cultivates learning to a diverse student and faculty body.

Any librarian involved or interested in information literacy and tutorial design should read **Webb & Hoover (2015)** in-depth research article. They applied the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model to create a

Biology Tutorial. In the Design phase, they used UDL's multiple means of representation and mapped the tutorial's content via four different representations modes (audio, visual, kinesthetic, text). We especially commend them for conducting a usability study with four students with learning disabilities. Nevertheless, we agree with what the author suggests as "Further research should be conducted to include user testing of UDL tutorial designs with students without learning disabilities. Technology is rapidly changing, and librarians need to be familiar with new software and methods that can assist with the creation of online learning tutorials. As each development in the field comes about, librarians can incorporate these evolutions to systematically design their tutorials; this includes ensuring that they have multiple means of representation of information literacy concepts for students" (2015, p. 549). Overall, their excellent UDL mapping techniques will help other librarians proactively create library tutorials that are as inclusive as possible and suitable for all kinds of learners.

Another research article **(Zhong, 2012)** depicts how UDL's pedagogy has been applied to an academic library's instruction program. The author provides a detailed lesson plan teaching Boolean logic and then juxtaposes traditional with UDL instructional methods. One of the strengths of this study is the thorough assessment of both – the traditional instruction or the UDL method via a web survey. Her three key findings are 1) students favor hands-on exercises, 2) group activities help students learn better, and 3) "students evaluated positively the effort of applying UDL principles in library instruction. Survey results suggest that although the number of students who reported disabilities

represented a small number in the class (three out of fifty), the majority of students reported benefiting from UDL-integrated instruction" (2012, p. 44). In conclusion, Zhong perceives incorporating UDL in library instruction as beneficial to all librarians teaching in academic libraries.

In summary, our literature review highlights only a few in-depth research articles applying UDL to academic libraries. To our profession and discipline's defense, though, we believe that academic libraries and librarians have used concepts from UDL and, of course, striven to diversity, equity, inclusion, and access already for many years. However, we agree with what Edyburn puts forth "I have offered an analysis of the developmental progress of UDL and described 10 propositions that need to be addressed as we go forward. Unless serious intellectual energy is devoted to addressing the current shortcomings of the UDL construct, within the next 10 years, we may be commemorating the passing of another education fad" (2010, p. 40).

Practical Guidelines for Academic Libraries

We will not address all areas in which academic libraries can adopt UDL in their work practice. Instead, we will focus on the “traditional triad of public services: access, reference, and instruction” (Coleman et al., 2016, p. 674). We will align the UDL guidelines to these three areas and, if applicable, its three UDL principles. Since UDL is intertwined with it, technology tips and recommendations will be mentioned as needed.

Access Services

Access services encompass many functions: circulation, stacks management, course reserve, interlibrary loan, and document delivery. Access Services is integral to academic libraries as it “interacts with all of our users: the students, where diversity abounds; the faculty, with expectations galore; [...] special populations with distinctive needs; and the world on the web that now wants to be connected and served” (Neal, 2013, p. vi). Course reserve, circulation, and interlibrary loan apply **the UDL principle of multiple means of representation.**

Course reserve, including electronic reserve, should include print books, eBooks audiobooks, books with multimedia add-ons such as videos, websites, and Open Education Resources (OER). If an academic library uses an electronic course reserve system, all uploaded books, book chapters, or articles must be available as searchable PDFs.

As part of **circulation,** many academic libraries lend videos, often done via an academic subscription to a streaming service. A high portion of videos should have closed captioning and transcript options, enhancing the educational experience and strengthening inclusiveness. However, if not, academic librarians need to hold the vendors accountable. For example, Kanopy, a streaming video subscription service, has a closed captioning request form available for videos without it (*Enabling Closed Captions, Subtitles, and Transcripts*, n.d.). Our call for vendor accountability is supported by Peacock & Vecchione. They state, "While it is partially a library's

responsibility on our campuses to provide accessible library materials, it is also the responsibility of our vendors to provide this service especially when the media is hosted on their platforms which are supposed to be accessible for the public" (Peacock & Vecchione, 2020, p. 6). Appendix A includes a link to *SUNY Library Vendor Accessibility Repository*, which links *to Library Vendor VPAT® Repository*.

Lending laptops and tablets in circulation support inclusiveness as tablets intrinsically have accessibility and assistive features that support learners with haptic, visual, and cognitive preferences. Tablets are also able to be tailored to different classroom situations and environments. Installing apps on tablets supports the representation of visual information, information processing, and display of information. While the sheer number of available apps is overwhelming, some good resources to find apps are available in Appendix A.

Many libraries share electronic articles with other participating libraries through **interlibrary loan**. Many of these articles are, by default, already in searchable PDF format. However, if a participating library scans print material, they should scan it as a PDF searchable document and not as a TIF document. Searchable PDFs not only support students who rely on accessibility or assistive technology, but anyone who wants to copy a direct quote into their research.

Reference Services

Academic librarians connect with a multitude of patrons. Reference librarians may meet students with identifiable or invisible disabilities, English as a Second Language (ESL)

students, and increasingly returning students. Librarians strive to create a welcoming, non-judgmental environment, encouraging teaching and learning interaction, inclusive to all learners. Students who appear indifferent or disengaged, in reality may be experiencing a learning difference that they want to keep private. Aligning reference services to the UDL principles of engagement and representation can support this student and others.

Multiple means of engagement adopt different kinds of reference services. The most traditional service is the Reference Desk itself, which gives students the option to have brief face-to-face support at the point of need. Encourage students to write down the steps of a research inquiry. If students prefer digital means to remember search steps, they can record the interaction via their mobile device or take a picture of the screen. Students can remember and retrace the reference interview by employing features on mobile devices such as a camera, apps for note-taking, and audio and video recording. Accessibility features for the two most common mobile operating systems are available on their websites (see also Appendix B).

Librarians also connect with students through reference consultations. Consultations allow librarians to prepare in advance to address the specific needs of students. "Certain questions require discretion, judgment, and advanced techniques" (Buss, 2016, p. 270). Students may need more guidance and support or prefer to meet privately, which can be responded to by a consultation offer from a subject librarian.

24/7 Virtual Chat via a website or texting is another way to support students' research needs. These virtual methods ease learning differences and improve communication and anonymity by reducing barriers to asking reference questions. This might help reserved students and second language speakers. It also offers a convenient way to communicate for those with cognitive or learning disabilities or mental illnesses such as social anxiety.

The principle of representation is presenting information in multiple formats, including text, graphics, audio, and video. For example, the virtual chat reference offers the option to send the chat transcript to students, which helps novice searchers reread and then repeat the search steps later. Of course, this is also beneficial to any researcher. Library catalogs, discovery systems, and databases used during the reference interaction need to adhere to multiple means of representation. “When purchasing materials, it is important to attend to a wide range of formats, rather than assuming that an item in one format will be accessible to all users” (Creamer, 2007, p. 13). Database vendors provide librarians with specific websites about their accessibility features. ProQuest and EBSCO have extensive accessibility support websites. In some databases, such as in Cengage's Gale Virtual Reference database, students can download articles as an MP3 file, advantageous for commuter students or audio learners. For a list, see also VPAT (Voluntary Product Accessibility Template), which is a document that indicates compliance with Section 508 accessibility guidelines included in Appendix A.

Concluding the principle of representation, we also recommend thinking about library catalogs or discovery systems: Does your catalog allow multiple means of representation for a call number? Can students text themselves the call number? If your system does not have this feature, then allow students to take a picture with their mobile device or access it directly from their device. Furthermore, to enhance the representation of your catalog-discovery system, include it in your library app and make it available as a mobile or responsive website.

Instruction

Information literacy instruction may be the easiest to proactively implement as the UDL framework was initially developed for access to the general classroom curriculum. The expectation of teaching the skill of information literacy in library instruction is evident at different points of need as “academic librarians are being called upon to teach more and more frequently and in many different formats and settings, i.e., one-shot sessions, semester courses, face-to-face, online, synchronous, asynchronous, etc." (Bryan, 2016, p. 340). The following shows how we have adopted the three principles proactively into instruction.

The **principle of multiple means of representation** delivers options for presenting materials and content for instruction. Students benefit from various information displays, including text, auditory and visual, and explicit instruction through steps when teaching a skill or concept. For example, during information literacy one-shot classes, librarians can insert usual methods to increase accessible learning options for all. Textual

representation includes providing handouts through email before class and in print during class. Emailing handouts in advance or after a class to students and professors allows for increased reading comprehension. Furthermore, some students may prefer to absorb the information and the steps provided, and some may prefer to listen to the document with an access device or accessibility technology.

If you use Microsoft Office products such as Word and PowerPoint for handouts, some simple guidelines will improve their accessibility (see also Appendix A).

Some recommendations include:

- embedding alternative (alt) text into your images,
- use of headings, and
- checking your Word document with the Accessibility checker feature.

If you use a PowerPoint presentation, you should follow similar protocols as those already mentioned.

Using **audio representation** in information literacy one-shot lessons and credit courses supports ESL students, students with hearing and visual impairments, and students who are aural learners. Visually impaired students may use a recorder to re-listen to steps provided by a professor as they are unable to read from handouts provided in class. Whenever appropriate, we incorporate mobile devices into our teaching and allow student usage as well since, "The capabilities of the iPad and other iOS devices present educators with a new means of providing content to learners with the flexibility and engagement described in the UDL guidelines" (McMahon & Walker, 2014, p. 48). One

example is using a dictionary app (e.g., Merriam Webster) that provides an audio representation (pronunciation, definition) in an engaging way to your students.

Visual representation with images, videos, and online tutorials reinforce and aid new learning concepts. Inclusiveness in video representation offers captioning and transcription as the default. CUNY's IT Accessibility Making Content Accessible website offers some guidelines such as:

"YouTube allows you to easily add captions to your videos. You can create captions using YouTube or import your own caption files. YouTube automatic captions are not accurate enough to meet the needs of students, but they can be a good start if you do not have a transcript available.

[…]

Amara is a free open source online captioning tool. Amara also hosts volunteer localization & accessibility communities, and offers professional tools and services for subtitles" (“Making Content Accessible,” n.d., sec. Captioning Videos)

Recommendations are also available for improving accessibility when teaching a credited course, starting with an accessible syllabus. Several articles included in the *Literature Review* above address this, but we would like to point out Tulane University's Accessible Syllabus Project. For further reference to it, see Appendix A.

Adopting the principle of action and expression for instruction means having different response options for students to increase their comprehension of the material. Optimize student participation by allowing them to write on whiteboards or smartboards, supplement with in-class worksheets, using clickers, online polling, and quizzes. You can also engage students with role-playing to help them express ideas about skills and concepts taught in class. Also, this is an informal and fun way to reinforce research strategies with all students.

Applying the **principle of multiple means of engagement** is to create an environment that motivates and challenges students. Create a classroom climate that is inclusive, respectful, and appreciative of diversity. Juxtaposing the library research theory with real-world activities helps sustain students' interests. The research process involves multiple steps, which can be challenging for students to understand and implement. To foster collaboration and communication among students, vary demands with co-teaching, guided peer discussions, and break the class into small groups, for example, in rounded seating. A flipped classroom model helps students comprehend lecture material and review video-recorded lectures before class. This active learning strategy engages students, "For example, in a traditional lecture, students cannot stop the instructor from talking as they take notes and reflect on what is being said. When watching video [*sic*], however, the students control the pace of the lecture" (Novak & Thibodeau, 2016, p. 124).

Conclusion

Adopting UDL for Academic Libraries is a work in progress, and we cannot explore and explain all aspects of the UDL framework regarding all library resources and services. However, we agree with what other authors such as Foley & Ferri demand by "Taking universal design one step further, by including disabled people in all aspects of the design, development, implementation, and marketing of technologies, the aim would be to develop technology that is both accessible and responsive" (2012, p. 199). We also applaud other others such as Thompson & Copeland (2020) or Dali & Caidi (2017) on their Diversity by Design thinking which is furthering "this conversation to the next level and realize that without diversity, there is no potential for growth and evolution and there is no way forward for society as a whole—economically, politically, intellectually, culturally, or otherwise. Only then will we address the 'integral' and be able to bring to life diversity by design. eliminate barriers to equitable services, spaces, resources, and scholarship" (2017, p. 96).

It is critical to point out the importance of collaboration, advocacy, and awareness. UDL does not exist in a vacuum. We want librarians to know that the principles are fluid and intertwined. Share your knowledge of UDL by training your peer librarians. Liaise with your discipline faculty, information technology, and online education departments to proactively raise awareness and learn from each other. Create an ongoing dialogue with your Office of Disability, Diversity, Equity, and Inclusion office or initiatives on your campus, most significantly, confer with university administration to develop strategic UDL initiatives to foster diversity, equity, inclusion, and access on your campus. In

summation, we hope that our article will inspire other academic librarians and libraries to adopt and think about supporting and fostering all kinds of student success in academia and beyond.

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Appendix A: Online Resource to Support the UDL framework

Accessibility and Assistive Technology

Accessibility – Navigation Guide EBSCO

https://connect.ebsco.com/s/article/Accessibility-Navigation-Guide?language=en_US

Accessibility - Mac – Apple
https://www.apple.com/accessibility/mac/
Accessibility in Teaching with Technology University of Michigan Library
https://sites.google.com/umich.edu/teachingtech/home

A 'learn as you do' accessibility checklist
https://uxdesign.cc/a-learn-as-you-do-accessibility-checklist-c657d9ed2c62

Accessible Syllabus Tulane University
https://accessiblesyllabus.tulane.edu/

CUNY IT Accessibility
http://www2.cuny.edu/accessibility/

Digital Accessibility and Universal Design for Learning: Digital Accessibility Presentation
http://guides.cuny.edu/digitalaccessibility/presentation

Mobile Devices
https://apps.apple.com/us/story/id1266441335
https://support.google.com/accessibility/android/?hl=en#topic=6007234

SUNY Library Vendor Accessibility Repository
https://slcny.libguides.com/vendor_accessibility

ProQuest Accessibility

https://about.proquest.com/en/about/proquest-accessibility

Web Content Accessibility Guidelines (WCAG) Overview
https://www.w3.org/WAI/intro/wcag

Website and Digital Accessibility
https://techsolutions.illinoisstate.edu/web-interactive-communications/accessibility/

We have web accessibility in mind
http://webaim.org/

Web Accessibility Toolkit | Making digital resources usable and accessible in research libraries
https://accessibility.arl.org/

Windows Accessibility Features | Microsoft Accessibility
https://www.microsoft.com/en-us/Accessibility/windows

Universal Design for Learning

Apps for UDL
https://alludl.ca/create/teaching/the-use-of-technology/apps-for-udl/

CAST Online Tools
https://www.cast.org/products-services/online-tools

Equal Access: Universal Design of Libraries
https://www.washington.edu/doit/equal-access-universal-design-libraries

UDL-Aligned Strategies
https://goalbookapp.com/toolkit/strategies

Multimedia Educational Resources for Learning and Online Teaching
https://tinyurl.com/lul9vvg

UDL Guidelines
https://udlguidelines.cast.org/

Universal Design for Learning at Durham College
http://cafe.durhamcollege.ca/index.php/curriculum-development/universal-design-for-learning/home-page

Worksheet – the UDL Project
https://www.theudlproject.com/uploads/8/8/1/9/8819970/udl_guidelines_-_educator_worksheet.doc

Appendix B: Further Recommended Readings

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