Principles of Universal Design: handouts

Principles of Universal Design (PowerPoint, 37 pages)

Tips for Creating Inclusive and Accessible Instruction for Adult Learners: An Overview of Accessibility and Universal Design (PAACE Journal, 20 p.)

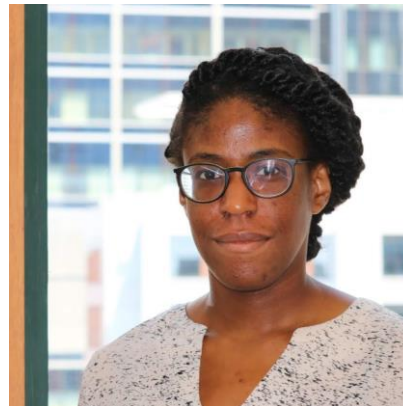Universal Design Resources (Institute for Community Inclusion, UMass Boston, 1 p.)

Universal Design for Learning: Guidelines… Online Instruction (Adult Learning, 12 p.)

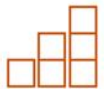# SABES Program Support
Professional Development Center

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❖ 2 - Welcoming and Etiquette (January 7th, 2020)

Email dani_scherer@worlded.org for materials

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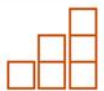
ESOL

Program Support

Institute for Community Inclusion
University of Massachusetts, Boston

David Hoff, M.S.W.
Program Director, Institute for Community Inclusion
UMass Boston

Maria Paiewonsky Ed.D.
Program Manager/Transition Specialist
Institute for Community Inclusion

Universal Design

David Hoff
Maria Paiewonsky

Institute for Community Inclusion
University of Massachusetts, Boston
www.communityinclusion.org

DISCUSSION

- How familiar are you with the term and concepts of universal design?

Universal Design

- Create environments that are usable by as many people as possible regardless of their age, size, ability, or disability

Different Paths – *Same* Destination

- **Design and composition of environment so that it may be accessed, understood and used:**
  - ➢ To greatest possible extent
  - ➢ In most independent and natural manner possible
  - ➢ In widest possible range of situations
  - ➢ Without need for adaptation, modification, assistive devices or specialized solutions, by any persons of any age or size or having any particular physical, sensory, mental health or intellectual ability or disability

PUSH TO OPEN

WAVE TO OPEN

BEA

- Physical environment
- Learning environment
- Service environment

Universal Design ➔ Universal Design for Learning
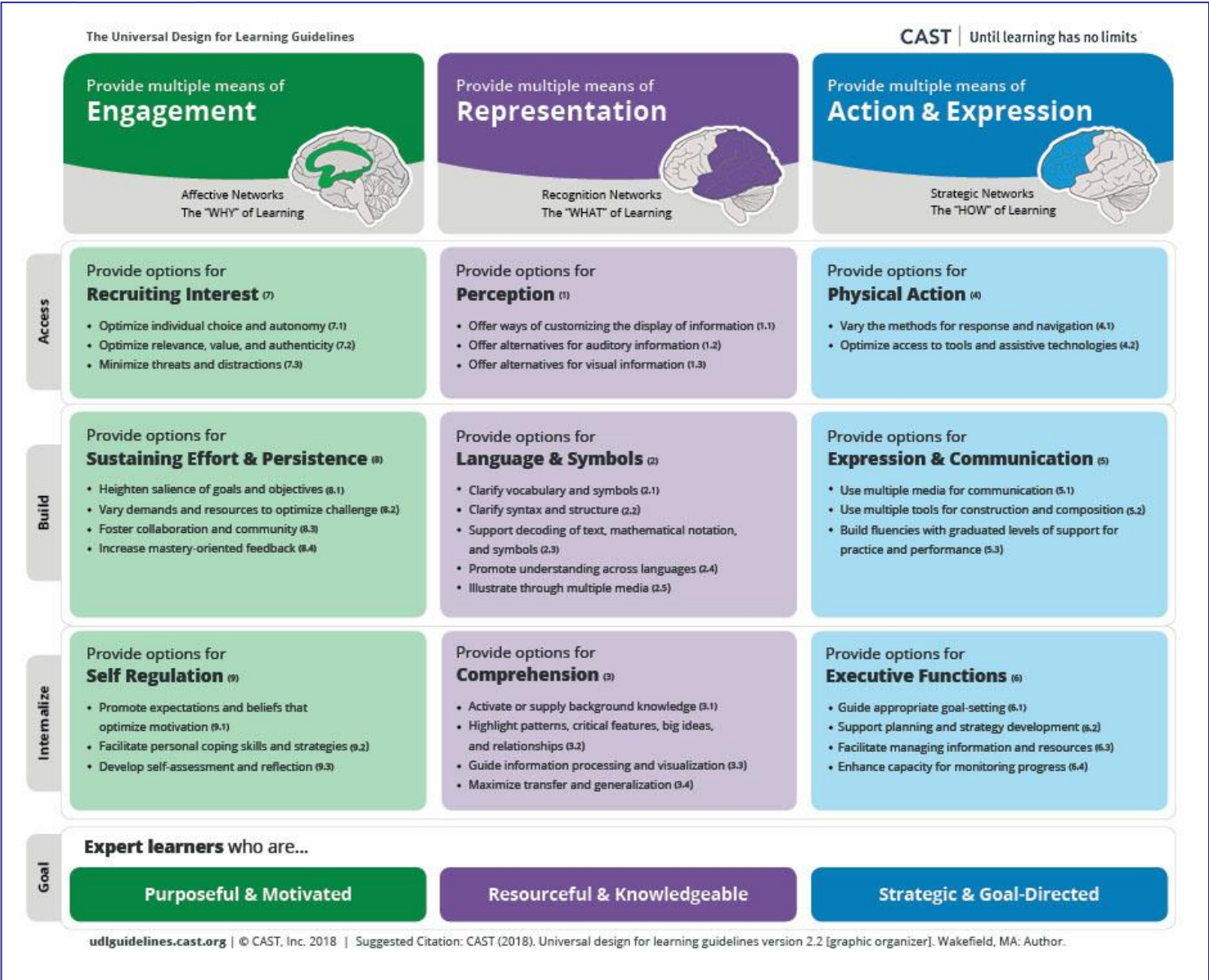
PRINCIPLES OF UNIVERSAL DESIGN FOR LEARNING

I. Provide Multiple Means of Representation

II. Provide Multiple Means of Action and Expression

III. Provide Multiple Means of Engagement

The Universal Design for Learning Guidelines

CAST | Until learning has no limits

Provide multiple means of **Engagement** Affective Networks The "WHY" of Learning	Provide multiple means of **Representation** Recognition Networks The "WHAT" of Learning	Provide multiple means of **Action & Expression** Strategic Networks The "HOW" of Learning
Access — Provide options for **Recruiting Interest** (7) • Optimize individual choice and autonomy (7.1) • Optimize relevance, value, and authenticity (7.2) • Minimize threats and distractions (7.3)	Provide options for **Perception** (1) • Offer ways of customizing the display of information (1.1) • Offer alternatives for auditory information (1.2) • Offer alternatives for visual information (1.3)	Provide options for **Physical Action** (4) • Vary the methods for response and navigation (4.1) • Optimize access to tools and assistive technologies (4.2)
Build — Provide options for **Sustaining Effort & Persistence** (8) • Heighten salience of goals and objectives (8.1) • Vary demands and resources to optimize challenge (8.2) • Foster collaboration and community (8.3) • Increase mastery-oriented feedback (8.4)	Provide options for **Language & Symbols** (2) • Clarify vocabulary and symbols (2.1) • Clarify syntax and structure (2.2) • Support decoding of text, mathematical notation, and symbols (2.3) • Promote understanding across languages (2.4) • Illustrate through multiple media (2.5)	Provide options for **Expression & Communication** (5) • Use multiple media for communication (5.1) • Use multiple tools for construction and composition (5.2) • Build fluencies with graduated levels of support for practice and performance (5.3)
Internalize — Provide options for **Self Regulation** (9) • Promote expectations and beliefs that optimize motivation (9.1) • Facilitate personal coping skills and strategies (9.2) • Develop self-assessment and reflection (9.3)	Provide options for **Comprehension** (3) • Activate or supply background knowledge (3.1) • Highlight patterns, critical features, big ideas, and relationships (3.2) • Guide information processing and visualization (3.3) • Maximize transfer and generalization (3.4)	Provide options for **Executive Functions** (6) • Guide appropriate goal-setting (6.1) • Support planning and strategy development (6.2) • Facilitate managing information and resources (6.3) • Enhance capacity for monitoring progress (6.4)
Goal — **Expert learners** who are... **Purposeful & Motivated**	**Resourceful & Knowledgeable**	**Strategic & Goal-Directed**

udlguidelines.cast.org | © CAST, Inc. 2018 | Suggested Citation: CAST (2018). Universal design for learning guidelines version 2.2 [graphic organizer]. Wakefield, MA: Author.

18

Alewife   ARR
Alewife   6 min

RED LINE
INBOUND

Public Policies that Support a Person with a Disability Working with a Job Coach

- The Rehabilitation Act of 1973 authorizes public VR funding for the individual's job development and placement activities
- CMS Waiver Program provides Medicaid funding for long-term placement supports such as job coaching and other assistance
- The Americans with Disabilities Act provides the right to reasonable accommodation, rights to to non-discrimination in hiring, and requires provision of accessible public transportation
- The Ticket to Work and Work Incentives Improvement Act of 1999 allows the individual to maintain health insurance through the state's Medicaid buy-in program, and establishes benefit counseling through the Work Incentive Planning & Assistance Program to help individual manage benefits

Does universal design mean that individual accommodations are **no longer necessary?**

- Individuals with disabilities often **self-accommodate** due to issues regarding **lack of trust and concern for negative consequence** of disclosing their disability.

- The practice of nondisclosure and self-accommodation does not always offer the **full spectrum of accessibility options** that may be available to the student.

- There is **considerable effort required in disclosing one's disability** and it is viewed as a barrier to full participation because of the effort it takes to report and request assistance within the institution.

- Creating a **disability-friendly institutional climate** is one way to improve outcomes for learners with disabilities.

Jacqueline McGinty
Tips for Creating Inclusive and Accessible Instruction for Adult Learners

- **Anticipate** needs
- Information available in **multiple formats**
- **Stress goal** of universal access to students
- **Avoid presumptions**
- **All students** asked about support and accommodation needs
- Provide a **list** of possible accommodations
- Disability-specific information to all students
- Maintain and respect **confidentiality**
- Incorporate feedback on universal access in **evaluation**
- **In-person and online**
- **Process never ends**

Brainstorming on UD Strategies
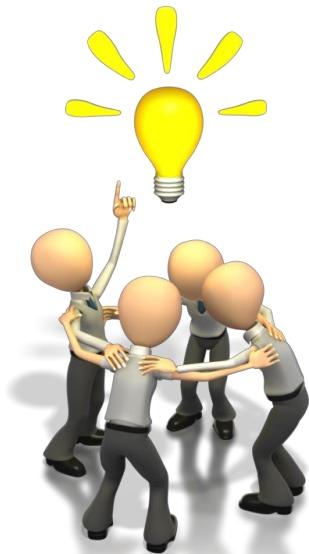
Environment
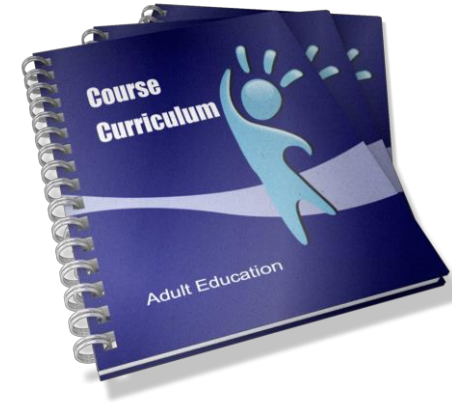
Curriculum

Instruction

Assessment

Don't Forget About UD Digitally and Online

Examples

- Closed caption video
- Images with alternate text
- Compatibility with screen reader
- Easy navigation

UDL Resources

Additional UD Resources

Handouts

1. **PowerPoint**

2. **UD Resources**

3. **Article:** *Tips for Creating Inclusive and Accessible Instruction for Adult Learners*

4. **Article:** *Universal Design for Learning – Guideline for Accessible Online Instruction*

Questions, Comments

"*Attitudes are caught, not taught.*"

• Fred Rogers

**SABES program PD Center
Upcoming relevant workshops:**

- Assistive Technologies and MassMATCH: Tour and Explore.
  - Spring date TBD.

- Tech Tools for Advising
  - February 4th in Boston
  - February 5th in Worcester

  Create account to see all events and register: https://www.sabes.org/

WORLD EDUCATION

Invited Article

Tips for Creating Inclusive and Accessible Instruction for Adult Learners: An Overview of Accessibility and Universal Design Methods for Adult Education Practitioners.

Jacqueline M. McGinty

Abstract

The field of adult education is rooted in social justice, equity, and inclusion. Adult learners with disabilities face significant challenges to inclusion in educational environments. To promote teaching practice that is inclusive for all learners, adult educators should be knowledgeable of teaching practices that reduce barriers for learners with disabilities. The purpose of this article is to provide information about accessibility for adult learners with disabilities and to suggest methods that adult educators can employ to create inclusive learning environments. This article describes the background of disability laws, the principles of Universal Design for Instruction, and offers tips for creating accessible learning materials.

Importance of Promoting Accessibility in Adult Education

According to the United States Census Bureau (2016), approximately 1 in 5 adults in the United States has a disability. "In the U.S., 1.7 percent of the population reports having a learning disability, totaling 4.6 million Americans" (Cortiella & Horowitz, 2014, p.29). For people

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with disabilities to participate in the workforce and engage within their communities, they need to possess the skills and knowledge prevalent in a 21st Century global economy (Carnevale, 2013; Morgan, Waite, & Diecuch, 2017). In order to obtain the skills necessary to be competitive in today's workforce, individuals with disabilities attend education and training programs that are available for all adult learners. The problem is that many learners with disabilities experience barriers to participation that interfere with their educational pursuits (Whitehouse, Ingram, & Silverstein, 2016).

The U.S. Census Bureau survey of Income and Program Participation (2016) notes that employment for adults with disabilities is significantly lower than for adults without disabilities (U.S. Census Bureau, 2016). According to the survey, "41 % of those age 21 to 64 with any disability were employed, compared with 79 percent of those with no disability." Along with the lower likelihood of having a job came the higher likelihood of experiencing persistent poverty; "that is, continuous poverty over a 24-month period" (U.S. Census Bureau, 2016). According to Whitehouse, Ingram, and Silverstein (2016), approximately 1 in 5 Americans live with a disability. To gain employment in the workforce, adults with disabilities need to possess a significant amount of reading, writing, calculating, and problem-solving skills (Carnevale, 2013). People with disabilities face particular barriers in regards to developing employability skills as well as finding, maintaining, and advancing in their careers (U.S. Bureau of Labor Statistics, 2012). These challenges include lower expectations from employers, misconceptions from society, and inaccessible programs and services (Whitehouse, Ingram, & Silverstein, 2016). In order to overcome the barriers to employment that exist, people with disabilities, need opportunities to participate in training and education environments that are equitable and promote development of all learners in a socially inclusive manner (World Health Organization, 2010). The U.S. Department of Labor, Office of Disability Employment Policy (2017), considers the investment in increasing community based and integrated employment opportunities for persons with disabilities a main priority. One integral piece of fulfilling this critical priority is to ensure that individuals with disabilities have access to programs and services available to all adults who seek various types of education and training (World Health Organization, 2010).

Although the development of basic literacy skills is a good step towards gaining employment, basic skills are often not sufficient to be competitive in today's 21st century workforce. In addition to pursuing

programs aimed towards employment skill development, many adults seek postsecondary credentials to gain the best paying employment positions (Ginsberg & Wlodkowski, 2010; Hong, 2015). At the Federal level, disability policy is focused on promoting employment and higher education is one of the pathways to improved financial status for individuals with disabilities (National Council on Disability, 2015; U.S. Census Bureau, 2016). The National Council on Disability (2015) states that postsecondary completion rates are lower for students with disabilities with only 34 percent completing a four-year degree in eight years. At all levels of adult education, learners with disabilities face unique challenges accessing and persisting in environments designed for non-disabled individuals (Cook, Rumrill, &Tankersley, 2009; Whitehouse, Ingram, & Silverstein, 2016).

Adult educators are an essential part of the academic accommodations landscape. Previous research has shown that student interaction with instructors is one of the factors related to the success of students with disabilities (Dallas, Sprong, & Upton, 2014; Hong, 2015). Since adult educators are often primary producers of academic content, they also share in the responsibility for making their content accessible (Carlton, Hertzfeld, &Yurcisin, 2017). Being able to acquire course material and participate without barriers in a learning environment is an important factor in the success of learners with disabilities. "Equitable participation is a means to a more just society" (Ginsberg& Wlodkowski, 2010, p. 32). The ability to provide instruction to all learners in the classroom is one of the most essential aspects of adult education practice (Ginsberg & Wlodkowski, 2010; Rocco & Delgado, 2011). However, many practitioners do not know how to identify students in need of accommodations and how to provide appropriate instruction to fit their learners' needs (Dallas, Sprong, & Upton, 2014, Polson & White, 2001; Rocco & Fornes, 2010). When an adult educator observes a learner who is not progressing, they often try to accommodate to meet the learner's needs (Polson & White, 2001). The instructor may have to take a trial and error approach to match the appropriate accommodation with the leaner until the learner can successfully navigate their way through the curriculum. Although there is guidance regarding the ADA laws when it comes to academic accommodations, there are gaps in the information available on how to accommodate learners with disabilities in various learning environments (McGuire, Scott, & Shaw, 2006; Schelly, Davies, & Spooner, 2011).

Laws Regarding Accessibility and Adult Education

The Federal laws that prevent discrimination against people with disabilities include the Rehabilitation Act of 1973, Section 504, and the Americans With Disabilities Act (ADA) of 1990 (Rocco & Fornes, 2010). The Americans with Disabilities Act of 1990 defines someone with a disability as a person who has an ailment, either physical or mental, that significantly limits one or more of their life activities. The laws associated with the ADA promote equal access for individuals with disabilities. The Americans With Disabilities Act (1990) ensures equal access by requiring that all public venues are accessible to persons with disabilities. The Act (1990) defines accessible as providing a person with a disability the opportunity to obtain the same information, have the same interactions, and participate in the same services as a person without a disability in an equal manner that is integrated within society. In addition to requiring accessibility within public spaces, the ADA (1990) also requires that information is easily obtainable in manners similar to those without a disability (ADA.gov, 2015). The ADA laws are designed to protect the rights of individuals with disabilities as equal members of society. These rights are extended to accessing public spaces, patronizing private businesses, and participating in programs that receive Federal funding from the U.S. Department of Education. The purpose of the Rehabilitation Act of 1973 was to prevent disability discrimination in federal programs and agencies, any program receiving government financial assistance, in federal employment, and with government contractors concerning work with persons with disabilities (The Americans With Disabilities Act of 1990, 2017). Section 504 of the Rehabilitation Act states that agencies that receive government funding are not allowed to discriminate against people with disabilities. The Americans with Disabilities Act, passed in 1990, included guidance from the Rehabilitation Act of 1973 and Section 504 to broaden the disability rights protection of individuals with disabilities.

Title II of the ADA ensures that programs of public education such as adult basic education classes provide qualified people with disabilities the right to participate in the services provided (Rocco & Fornes, 2010). The ADA also requires that all public facilities offer accommodations to persons with disabilities so that they can participate in the goods and services offered. Title III of the ADA requires that private entities also provide both physical and academic accommodations to individuals with

disabilities ("The Americans With Disabilities Act of 1990", 2017). According to the ADA laws, the term accessible means that an individual with a disability is allowed to receive the same information, participate in the same interactions, and have the same services as a person without a disability ("The Americans With Disabilities Act of 1990", 2017). The ADA laws ensure that participation for individuals with disabilities is carried out in equal and integrative ways. The Americans with Disabilities laws also include the guidance that an individual with a disability should have the opportunity to receive information completely and independently just as anyone without a disability would ("The Americans With Disabilities Act of 1990", 2017). The ADA laws have been updated and amended to clarify the meaning and definition of the term disability to ensure that it would be broad reaching and applied without the need to consistently reanalyze the ADA laws.

Although the Americans with Disabilities Act has defined the rules regarding the participation of students with disabilities in educational programs, it is less clear on how institutions are to provide the necessary accommodations. The ADA protections that were developed from the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 requires that institutions allow reasonable accommodations to all qualified program participants ("The Americans With Disabilities Act of 1990", 2017). The U.S. Department of Education considers a reasonable accommodation to be any adjustment or altering of a task, process, or environment that will allow equal participation for individuals with disabilities (2007). Each institution has to determine their accessibility policies and plans to meet the requirements of providing reasonable accommodations. For adult learners to qualify for reasonable accommodations, they must prove that their disability limits their participation. This burden of proof is often a barrier to learners who do not have the financial and medical resources to document their disability. In order to document a disability a person needs to be evaluated by a licensed psychologist (U.S. Office of Personnel Management, 2017). Individuals seeking disability status must provide documentation about their disability that includes details about the extent of the limitations. Also, individuals with disabilities must show that they are "otherwise qualified" for the program, meaning, "the person must be able to meet the essential eligibility requirements of a program with or without reasonable accommodation" (Rocco & Fornes, 2010, p. 383). Adult educators can assist individuals who are seeking disability documentation

by informing them of the resources available to them and creating an inviting atmosphere that readily implements accommodations for learners with disabilities.

Cultural and Institutional Barriers to Helping
Adult Learners with Disabilities

In previous studies, students with disabilities report that they have concerns regarding negative disability stereotypes and confidentiality from instructors (Barnard-Brak, Lectenberger, & Lan, 2010; Timmerman & Mulvihill, 2015). Individuals with disabilities often self-accommodate due to issues regarding the lack of trust and concern for negative consequence of disclosing their disability. The practice of non-disclosure and self-accommodation does not always offer the full spectrum of accessibility options that may be available to the student. There is considerable effort required in disclosing one's disability and it is viewed as a barrier to full participation because of the effort it takes to report and request assistance within the institution. Creating a disability-friendly institutional climate is one way to improve outcomes for learners with disabilities (Huger, 2011). The fact that "anyone can become disabled, whether it is temporary or an onset of a debilitating illness, genetically predisposed, or traumatically induced" is an important issue to consider when promoting change at the institutional level (Clark, 2006, p. 309). A disability friendly climate serves to increase sensitivity and acceptance of those who are different and offers increased value for all learners.

Promoting a disability-friendly institutional climate begins with understanding and addressing Ableism. As stated by Griffin, Peters, and Smith (2007) "Ableism is disability oppression, a pervasive system of discrimination and exclusion of people with disabilities. Like racism, sexism, and other forms of oppression, ableism operates on individual, institutional, and cultural levels to privilege temporarily able-bodied people and disadvantage people with disabilities" (2007, p. 335). An important step in addressing this form of inequity in education is to discover ways to change the idea that accommodations in the physical environment are an equitable solution to inclusion for learners with disabilities in academic programs. Providing access to their buildings and offering resources for learners with physical disabilities is something that most education institutions can provide. However, there is much more work that can be done to improve accessibility practices overall. Participation in education should not be limited by a person's disability

status. As proposed by Rocco and Delgado (2011), "Culture and belief systems support the attitude that disability is abnormal and pitiful" (p.7). As communities of educational practice, we have options for how we socially construct our views regarding disability. To promote accessibility within our educational institutions, the dialogue should be explored to understand the embedded expressions of ableism that exists in our culture. It is important to recognize that having a disability does not mean that a person is less capable, worthy, or able to perform as any other member of society. Universal Design for architecture and instruction addresses some of the barriers across institutions. More work is needed to share information with others about disability etiquette and how ableism affects our practices.

Tips for Creating Inclusive Learning Environments

There is no one size fits all approach to determining the most effective accommodations for adult learners. To be most effective, adult educators should have some foundational information that describes different types of disabilities and understand that there are accommodations that they can provide for their learners (Grasgreen, 2013; Ingeno, 2013). Numerous different approaches exist for providing inclusive and accessible learning environments for adult learners. Instructor facilitated academic accommodations are often suggested based on the individual disability and possible instructional aids. As suggested by Rocco & Fornes (2010), if a learner has a hearing impairment they may need visual aids and have seating that places them where they can view the instructor. Students with learning disabilities may need the assistance of a note taker or extended time on exams and assignments. Other common classroom accommodations include large print materials, supplemental light, electronic textbooks and materials, and alternative testing arrangements. It is also important to consider room temperature, distractions from equipment sounds, and seating arrangements that allow for free movement around the classroom (Rocco & Fornes, 2010).

With the increase in online learning, accommodations for students with disabilities are expanding to include guidelines and options for online materials. If materials for classes are in digital format, it is important to ensure that videos include closed captions, images have alternate text, and that course materials are correctly formatted for compatibility with screen readers (WebAIM, 2017). Online course design should provide logical order for learning modules, ease of navigation throughout the

learning management system, and module overview pages that include clear directions on expectations (Burgstahler, 2017). Today's classroom frequently use digital learning materials and it is essential that educators take steps to ensure that their digital materials meet the accessibility standards (Burgstahler, 2017; WebAIM, 2017). Resources for instructors are available on topics related to online course design and other issues covering web accessibility. Web Accessibility In Mind, WebAIM, is an organization dedicated to helping organizations understand accessibility for their digital content. The resources section of their website, webaim. org, offers accessibility checking tools, tips for instructional designers, videos on the experiences of students with disabilities, and simulations on navigating content with different disabilities (WebAim, 2017).

Each instructor should work with the learner to determine the best combination of accommodations to ensure their equal participation in the educational environment. Adult educators can benefit from information on reliable internet sources and disability service offices. Not all programs have access to experts with knowledge of accessibility practices and instructors often have limited time to devote to acquiring the knowledge and skill needed to serve learners with disabilities. It is important to share information and best practices to increase the knowledge and expertise of adult educators when it comes to creating inclusive learning environments. Because of the difficulties with managing the accessibility of course environments and materials, many educators seek to create barrier-free learning environments by utilizing the principles of Universal Design for Learning (UDL) to address the complexities involved in understanding and providing accommodations.

Universal Design for Learning

One approach for broadening program inclusion is to include accessibility features from the beginning of the course development. Universal Design for Learning (UDL) is one name given to this inclusive program design and teaching strategy. Many training programs involved with promoting inclusive pedagogies recommend the use of Universal Design for Instruction (Schelly, Davies, & Spooner, 2011). The National Center on Universal Design for Learning, udlcenter.org, guides education professionals on how to develop learning materials that are accessible by diverse audiences (CAST, 2011). The initial inspiration for UDL came from the field of architecture which promoted universal design of architecture that included built in accessibility features instead of adding

the features after the construction was completed (Lombardi & Murray, 2011). Universal Design techniques offer principles for creating a curriculum that is accessible to multiple audiences which includes detailed guidelines for those who design academic content to follow. The UDL framework was built from research in learning sciences. The National Center on Universal Design for Learning, created the three main principles of UDL, provide multiple means of 1) interpretation, 2) action and expression, and 3) engagement from a review of cognitive science and other aspects of human learning (CAST, 2011). The principles of UDL promote pedagogy that addresses individual differences in learning and recognizes that there are multiple pathways for acquiring and demonstrating knowledge.

With the increasing numbers of adult learners with varying types of disabilities and the need for a diverse array of associated accommodations, Universal Design has become an essential practice in many instructional design approaches. The application of Universal Design goes beyond the guidelines for meeting the Americans with Disabilities Act accommodation standards. Universal Design approaches intend to create barrier free instruction that promotes learning environments that view disability from a social model as opposed to a medical model (Dallas, Sprong, & Upton, 2014). Utilizing a Universal Design approach would support all students and decrease the need for reorganizing courses with academic accommodations for students with disabilities (Dallas, Sprong, & Upton, 2014). Universal Design for Learning promotes a socially inclusive approach to teaching by equally engaging all learners regardless of their physical, cognitive, cultural, and linguistic limitations.

Universal Design for Learning can benefit adult students by providing a variety of instructional techniques and offering a flexible curriculum that will engage learners with different abilities and backgrounds (TEAL Center, 2010). Adult education instructors can employ Universal Design principles to assist all learners, including those with special needs, in understanding content and demonstrating their abilities in multiple ways. Since instructors often have a heavy workload, applying Universal Design principles from the beginning of course creation could reduce the workload overall. Instead of operating from a trial and error approach, instructors can take steps to build accessibility features into their courses to benefit a variety of adult learners. By putting Universal Design into practice, adult educators can feel confident that they are using the best approaches for creating an inclusive teaching environment (Lombardi & Murray, 2011).

The Universal Design for Learning framework follows three principles that address the what, how, and why of learning (TEAL Center, 2010). The National Center on Universal Design for Learning (UDL) outlines a framework for the Universal Design Standards. The main principles for the standards are that the learning design provides multiple means of 1) interpretation, the "what" of learning, 2) action and expression, the "how" of learning, and 3) engagement, the "why" of learning (CAST, 2011). UDL offers guidelines for designing curriculum that provide equal opportunity for all learners regardless of their ability, cultural background, age, gender, and linguistic background. The "what" of learning relates to the knowledge domain where learners recognize concepts, recall facts, and categorize information from our senses. In defining the "what" of learning, UDL suggests that providing multiple means of perception, communication, and comprehension encourages resourcefulness and creativity in learning. The "how" of learning refers to the ways that learners plan and complete tasks. To demonstrate "how" they know, learners need to use planning and organization to solve problems, write essays, and complete other strategic tasks. In addition to varying the means in which learners demonstrate their knowledge, instructors can regulate the time allotted for task completion, encourage learners to manage their learning, and promote the organizational skills needed to be successful. The third principle of UDL describes the "why" or the affective components of the learning experience. These elements relate to motivation and emphasize ways to engage learners including promoting real-world examples, personal choice, and relevancy that encourage persistence.

The first principle of UDL is providing multiple means of representation includes giving learners options for perceiving, expressing, and comprehending information. Some learners may grasp information more readily through visual or auditory means while others may prefer printed text. Providing explanations for vocabulary words, explaining mathematical symbols, and providing background knowledge on topics can assist learners with interpreting information. Adult educators should aid learners in the translation of information into usable forms by providing flexibility in your teaching approaches and materials. By providing information in multiple formats, adult educators will be able to address different learning styles and promote learning transfer by allowing learners to make connections with concepts (CAST, 2011). Taking a flexible approach to learning design and delivery will also foster a safe and in-

clusive environment which can decrease apprehension and provide opportunity for engagement and participation for anxious learners.

The second principle of UDL, providing multiple means of action and expression, addresses the fact that learners can experience environments from various perspectives and that they can adequately express their knowledge in different ways (CAST, 2011). There is difference in the ways that learners utilize learning materials. Individuals with physical impairments may not be able to use a textbook and alternative materials should be available. In addition to providing access to alternate materials that can be used with assistive technologies, instructors should consider incorporating options for expressing knowledge. Some examples of varying the "how" of learning include allowing learners to complete activities as written text, narrative presentations, or visual formats, providing number tiles for mathematics calculations, use of concept mapping to encourage the connection of information, and offering sentence starters for aid in writing practice. The UDL concept of providing multiple means of action and expression also suggests including support for persistence and goal setting. Scaffold information to allow for learners to progress from simpler to more complex information to avoid frustration that may prevent them from reaching their goals.

The third principle of UDL states that individuals have multiple ways of engaging in the learning experience (CAST, 2011). Principle three focuses on the affective dimensions of motivation, and engagement. In order to engage all learners, adult educators should provide examples and explanations that would be relevant for diverse learners. Factors such as cognition, culture, and context will vary for different learners and instructors should take a variety of approaches to increase the likelihood of engagement. To connect with student interests adult educators should offer choices when determining topics, use a variety of activities, and create authentic learning outcomes that link to real world problems (CAST, 2011). In order to increase learner engagement instructors should also create a safe environment, free from distractions, to allow learners to feel included. An inclusive classroom environment will promote learner interaction, collaboration, and support persistence with learning tasks.

The implementation of UDL can complement many other teaching methods and provide support for facilitating the problem solving and critical thinking skills necessary for employment and participation in life-long education. UDL supports collaborative learning, project-based

learning, differentiated instruction, and performance-based assessment (TEAL, 2010). The primary principles of UDL promote flexibility and encourage the facilitation of learning with multiple options for engagement. "All students, including those learning English, older students, and those with disabilities appreciate the multifaceted ways content is presented, as well as options for demonstrating what they know" (TEAL, 2010, p.2). One way to transform educational access for all students, not only students with disabilities, is to practice the principles of Universal Design for Learning (Pilner & Johnson, 2004). According to Schelly et al., (2011) "Universal Design for Learning is promoted as a model for good teaching generally, and as such it is becoming an important part of a broader conversation about pedagogy" (p. 18).

Barriers to Adopting Universal Design of Learning

Even though the concept of Universal Design has been suggested as a way to provide inclusive educational content, educational institutions have not fully adopted its practices. A few of the barriers cited by institutions as preventing the implementation of UDL include limited resources for training on accessibility issues, the expense of purchasing new technologies, and other competing priorities within the organization (Raue & Lewis, 2011). It is important to promote the use of Universal Design for Instruction to account for the need to accommodate learners with varying types of disability including physical, developmental, mental, cognitive, and sensory needs. By increasing one's knowledge and use of inclusive design strategies adult educators can improve the accessibility of academic content encountered by learners, thus reducing the need to provide accommodations after the instructor has created the content. The implementation of universal design principles in learning environments can help to change the dominant paradigm that privileges specific learning methods over others. By modeling change at the institutional and program level, inclusive education practices such as Universal Design for Learning, can be shared with other adult educators to improve outcomes and further promote equality across learning institutions.

Recommendations for Increasing Accessibility in Adult Education

In addition to taking a Universal Design approach in the classroom, adult educators can implement accessible strategies into their practice

and course materials. Adult educators are instrumental in the facilitation of accommodations for students with disabilities and inclusive education practices overall because they create and disseminate academic content. There are steps that adult educators can take to ensure that their instructional content is accessible to learners with disabilities. The following methods can be immediately applied to your instructional approach and will begin to reduce the barriers to inclusion that exist within common education practices.

One of the first steps that adult educators can take is to include a statement of accessibility in course syllabi and organizational materials. Take steps to identify alternative options for learners. If working in an adult literacy program, provide learners with information regarding the ADA and high school equivalency testing accommodations. In higher education environments, connect with the campus disability service office for guidance on providing accommodations and creating inclusive classroom environments. The practice of offering information for learners regarding accommodations shows learners that the instructor is knowledgeable about accessibility and accepting towards individuals with diverse abilities.

When creating learning materials, use headings & styles in Word documents instead of using bold and large print to signify important document sections. The preset headings and styles in Word are compatible with screen readers. The same principles are true with PowerPoint presentations. PowerPoint offers presentation themes which are already set up for compatibility with assistive technologies. For presentations and other course materials, use high-contrast styles. High contrast style involves making sure that the color content is appropriate for all learners. Dark writing on a dark background is difficult to read while light writing on a light background is similarly difficult to read. In addition to contrast issues, carefully consider the use of color in materials. Avoid using color as an identifier or to provide directions in course assignments. For example, do not have learners circle all of the blue words or all of the red numbers. Some learners cannot see color readily and the use of color as part of a course assessment can be limiting. Select fonts that are in the Sans Serif category. Sans Serif fonts such as Helvetica, Avant Garde, Arial, and Geneva do not have extending features, called serifs, at the ends of the letters. Fonts that do not have serifs are easier to read because they do not contain the additional extending details that serif fonts include.

When scanning documents to Portable Document Format (PDF) file, take steps to make them searchable by assistive technologies. PDF files create images of documents that are not readable by assistive technologies unless the instructor converts them to recognizable text. Instructors often copy materials into PDF format to share in the classroom without taking the steps necessary to make the PDF compatible with assistive technologies. In Adobe Acrobat Pro there is a recognize text option available in the software toolbar. For more information on how to ensure PDF accessibility refer to the Adobe Acrobat user guides available within the software. For graphics in learning materials, create Alternative Text for images (ALT text). ALT text describes pictures presented in online formats. With multi-media content, use videos that have closed captioning. Closed captioning is the text subtitles on the screen that provides the script of the narration in the video. If creating original videos include closed captioning. Websites such as YouTube offer instructions on how to caption videos in addition to offering auto-captioning features to videos that are labeled in public and unlisted domains. If closed captions on videos are not available, provide a transcript of the video as an option for learners.

In adult education programs that focus on preparing learners for high school equivalency testing, provide information about how to receive accommodations when taking the test. According to the Learning Disabilities Association of America, "some testing accommodations do not require documentation, such as earplugs, one test per day, priority seating, large-print test, straightedge, temporary adhesive with spatial directions, magnifying devices, colored transparent overlays, clear transparent overlays, highlighting, and the use of graph paper for working math problems" (2017).

It is essential to confirm that learners are aware of the various accommodations available to them and to provide assistance with accessing the appropriate services necessary for success. The Learning Disabilities Association of America, www.ldamerica.org, provides resources for professionals who work with individuals with learning disabilities including testing accommodations, strategies for teaching learners with disabilities, and information about the different types of learning disabilities. The U.S. Department of Education provides resources for programs and educators regarding accessibility requirements and practices necessary to support learners with disabilities. Their website, www.ed.gov, offers information about disability discrimination, laws regarding disability discrimination, and details relating to specific education environments.

Promote Disability Etiquette

Even though institutions provide guidelines for disability etiquette, the practices are not fully integrated into the institutional culture. According to the Merriam Webster Dictionary, the term etiquette, means "the rules indicating the proper way to behave" (etiquette, n.d). Disability etiquette practices promote full inclusion of disabled persons in society and challenges ableism that is present in society. According to Griffin, Peters, and Smith (2007), "Perspectives on disability are shaped by cultural beliefs about the value of human life, health, productivity, independence, normality, and beauty. Such beliefs are reflected through institutional values and environments that are often hostile to people whose abilities fall outside of what is culturally defined as normal" (p.336). Modeling inclusive behaviors and reflecting upon able-bodied privilege is an important step for organizations to take when shifting to a disability welcoming approach. According to Tatum (2013), the direct implementation of the ADA is loosely enforced and that in order to address ableist practices individuals need to take steps to avoid ableism in daily life (Sec 6). For those in the dominant, temporarily, able-bodied, group, disability oppression is not easily recognized. According to Bell (2007), "members of dominant or advantaged groups also internalize the system of oppression and can operate as agents of the system by perpetuating oppressive norms, policies, and practices" (p.12). This internalization can lead to feelings of fear, guilt, and avoidance in order to continue to see society through a distorted lens (Bell, 2007). To change the institutional privilege, adult educators should evaluate the ways in which their practices ignore disability and continue to support privilege. According to Griffin, et al., (2007), "People with disabilities experience discrimination, segregation, and isolation as a result of other people's prejudice and institutional ableism, not because of the disability itself" (p. 342). Discrimination has roots in individual fear and insecurity which creates stereotypes that persist in education and in society. Fairness in practice is an essential component of adult education practice. According to Brookfield and Holst, (2011), "Fairness requires a good faith commitment of people of very different racial group memberships, ethnic affiliation, and cultural identity to learn to appreciate the different ways members of each group view the world and consider what counts as appropriate action" (p. 13). The equality of education is supported by the notion that we can learn to live with "profound difference" and discover

how to exist with a collective identity designed to include instead of diminishing the rights of others (Brookfield & Holst, 2011).

Conclusion

Adult educators should understand the different aspects of the accommodations needed for students with disabilities and utilize inclusive education principles such as Universal Design for Instruction. Just as architects design buildings to accommodate individuals with disabilities; adult educators can create academic content that has accommodative features built into the design. Accessibility practices and the rights of learners with disabilities to pursue education is an important issue for every educator to consider. There is a need for academic content to be accessible to all participants and for adult educators to promote inclusion in all aspects of the learning environment. Acquiring accessible course content is one of the most common barriers to success for students with disabilities (Timmerman & Mulvihill, 2015).

Universal Design for Instruction is an appropriate strategy to use to account for the need to accommodate students with varying types of disabilities. Increasing the knowledge and inclusive design tools of adult educators can reduce the need to provide accommodations after the content has been created. Universal Design for Learning approaches have been shown to improve the accessibility of academic content encountered by learners and to promote barrier-free learning. The implementation of Universal Design principles in adult learning environments can foster change in an educational system which values specific learning methods over others. We can share knowledge of inclusive practices, such as Universal Design for Learning, by modeling change at the institution and program level improving outcomes and further promoting equality for all adult learners.

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CAST - www.cast.org
Nonprofit education research and development organization that works to expand learning opportunities for all individuals through Universal Design for Learning.
- **National Center on Universal Design for Learning – www.udlcenter.org**
  CAST center with mission to shine spotlight on the stories, people, ideas, and conversations about and around universal design for learning.
- **Universal Design on Campus – http://udloncampus.cast.org/**
  CAST center focused on universal design in post-secondary education.

Center for Excellence in Universal Design – http://universaldesign.ie
Ireland based organization dedicated to enabling the design of environments that can be accessed, understood and used regardless of a person's age, size, ability or disability.

Institute for Human Centered Design – https://humancentereddesign.org
Organization based in Boston, dedicated to enhancing the experiences of people of all ages, abilities, and cultures through excellence in design.

Think College - Universal Design - https://thinkcollege.net/think-college-learn/universal-design
Eight part resource from Think College at the Institute for Community Inclusion, on application of universal design to higher education.

WebAim: Web Accessibility in Mind - https://webaim.org
Comprehensive resource on web accessibility.

W3C Web Accessibility Initiative - www.w3.org/WAI
World Wide Web Consortium website with extensive resources on web accessibility.
- **WCAG 2.1 – Web Content Accessibility Guidelines 2.1 - www.w3.org/TR/WCAG21**
  Accessibility guidelines from the World Wide Web Consortium.

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Universal Design for Learning

Guidelines for Accessible Online Instruction

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Abstract: Universal Design for Learning (UDL) is a framework for the teaching–learning transaction that conceptualizes knowledge through learner-centered foci emphasizing accessibility, collaboration, and community. Given the importance of access to achieving social justice, UDL is a promising approach to meeting all learners' needs more effectively. In this article, the history and philosophy of UDL are discussed and elaborated, followed by an explanation of how the principles of UDL were used to improve an existing online course offering for adult learners.

Keywords: UDL, accessibility, online learning, epistemology, adult learners

> " By following the well-established, but seldom utilized, principles of UDL, adult educators are able to reimagine the ways learning occurs and is assessed in the online classroom. "

Introduction

The use of Universal Design for Learning (UDL) is effective in enhancing a learner's ability to acquire, generate, and use new knowledge. Its coincidence with technological developments and advances has afforded the opportunity for greater inclusivity. Despite the possibilities presented by online education and new technologies, students with disabilities, language barriers, and low socioeconomic status are often less successful in school than students from the dominant culture (Aronson, 2008; Gregg, 2007; Kanno & Kangas, 2014), in part because one-size-fits-all education does not work. Merely applying technology tools is not enough; educators in all sectors—from higher education to community-based education, from formal settings to nonformal settings—need to change their ways of thinking. By following the well-established, but seldom utilized, principles of UDL, adult educators are able to reimagine the ways learning occurs and is assessed in the online classroom. More than simple indicators of best practices or lists of possible accommodations, UDL offers an epistemological shift that facilitates design for all learners within a holistic framework. The application of this epistemological shift helps address significant practical and justice concerns.

David Rose, Anne Meyer, and colleagues at the Center for Applied Special Technology (CAST) are credited with originating the term UDL. It applies

Ronald Mace's universal designs in architecture to teaching and learning. UDL has been used with "students with atypical backgrounds in the dominant language, cognitive strategies, culture, or history of the average classroom who, therefore, face barriers in accessing information when presented in a manner that assumes a common background among all students" (Rose, Harbour, Johnston, Daley, & Abarbanell, 2006, p. 3). A useful metaphor for UDL, offered by Edyburn (2010), is the fairy tale of Goldilocks; educators should offer students the chance to "try multiple options to determine which option is 'just right' for ensuring their performance is acceptable to meet high standards" (p. 39). With UDL, there is a focus on learning relevance, value, and authenticity in terms of learners' needs and desires through the inclusion of real-life tasks and an understanding of the importance of flexibility. By shifting to a learner-centered education and emphasizing collaboration and community, students become motivated to meet high expectations (CAST, 2015). Returning to the Goldilocks metaphor, designing courses with the intention of helping each student find the approach to acquiring, generating, and using new knowledge that is just right for him or her represents a different set of priorities than is traditionally the case. It is a different way of framing the teaching–learning transaction.

The need for this kind of epistemological and priority shift is increasingly evident. Distance and postsecondary education instructors face increasingly diverse students with disabilities, language and cultural barriers, and significant skill deficiencies (Bates, 2005). In spite of this demographic diversity, the type of education delivered has not significantly changed (Baggaley, 2008; Lee, 2017). Individual accommodations are often applied, but the structure and culture of higher education, and the nature of what constitutes knowledge, its acquisition, and its expression in practice, have not responded. Traditional behavioristic methods such as multiple choice assessments or text-based discussions do not effectively capitalize on students' differences and demands. Moving beyond more behavioristic approaches, "[f]lexible instruction designed within UDL framework ensures that learners have multiple means to engage in learning, are given the information and content instruction through multiple modalities, and have an opportunity to

demonstrate their learning via multiple means" (Hollingshead, 2017, pp. 1-2).

Non-UDL course designs often view diverse needs from a deficit perspective; to level the playing field, certain compensatory accommodations must be made to meet socially constructed norms or impose a standardized methodology. Accommodations offered to students are frequently ineffective because they focus on students' disabilities rather than on an understanding of students' needs in the overall context of the course (Cawthon & Cole, 2010; Kurth & Mellard, 2006). UDL, however, accommodates diversity in different ways as it reorients how knowledge is defined, obtained, and expressed by embracing difference (Meyer, Rose, & Gordon, 2014). Every learner has limitations (Shakespeare & Watson, 2002) depending on how the content is structured and shared. UDL effectively offers multiple means of representation that give learners various ways of acquiring information and knowledge; multiple means of engagement that tap into learners' interests, challenging and motivating them; and multiple means of expression that provide learners with alternatives for demonstrating what they know (CAST, 2015). These multiple means of representation, engagement, and expression are where the rubber meets the road for the epistemological shift and constitute the mechanisms used to meet all learners' needs more effectively. In this vein, Hollingshead (2017) argues,

> Although, the UDL framework was initially conceptualized with students with disabilities in mind, it quickly shifted the focus from the student's disability to the "disabled curriculum" (Rappolt-Schlichtmann, Daley, & Rose, 2012). In other words, the students were not the "problem" but rather the instruction (i.e., goals, methods, materials, and assessment strategies) was too constricted and not flexible enough to accommodate the diversity of students in the current school system (Meyer & Rose, 2000; Rappolt-Schlichtmann et al., 2012; Rose & Gravel, 2010; Rose & Meyer, 2000; Rose, Meyer, & Hitchcock, 2005). (p. 4)

Essential to understanding and incorporating UDL principles is acknowledging that, although systematic

design and planning is a key to effective online instruction, one strategy does not necessarily meet the needs of every student. UDL encourages design that differentiates and individualizes instruction more than traditional design frameworks (Hall, Vue, Strangman, & Meyer, 2004). Its goal is to provide options for every learner, just like Goldilocks.

The History and Ethos of UDL

Ronald Mace's work at The Center for Universal Design (CUD) at North Carolina State University in the 1980s and 1990s used architecture as a framework for understanding multiple means of providing options for everyone. As an architect, product designer, and educator, Mace used the term universal design "to describe the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life" (North Carolina State University [NCSU], CUD, 2008). Story, Mueller, and Mace (1998) recognized the key feature of universal design as its shift away from accommodating disabilities and creating barrier-free buildings to building structures whose design is beneficial for all individuals whether disabled or not. The traditional mind-set is turned on its head. They pointed out that traditional accommodations tended to be unattractive, segregated persons with disabilities, and were more expensive. Building and product features using universal design benefit disabled and nondisabled alike, and they are inclusive and often less costly. There are seven principles of universal design encompassing equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and size and space for approach and use (NCSU, CUD, 2008). UDL incorporates these ideas in educational settings by condensing them into the three guiding principles mentioned above: multiple means of representation, multiple means of action and expression, and multiple means of engagement (CAST, 2015). From these broad guiding principles, an array of approaches and practices to accessible learning design is generated.

The motivation for greater inclusivity and accessibility in education came, in part, from policy innovations. The call for inclusive education had been established by Section 504 of the Rehabilitation Act, passed in the 1970s, and the 1990 Individuals With Disabilities Education Act (IDEA; U.S. Department of Justice, 2016). The rights of students with disabilities to be included in mainstream classes was based on IDEA's demand for placing students in the "least restrictive environment" (National Center for Universal Design for Learning at Center for Applied Special Technology [NCUDL at CAST], 2012). Although the focus of IDEA is on students aged 3 to 21 years and applies mainly to K-12 educational settings, the Americans With Disabilities Act of 1990 more broadly affects individuals with disabilities throughout their life span, guaranteeing them access to lifelong learning programs on an equal basis with other citizens (U.S. Department of Justice, 2016).

In addition to the policy sphere, several social forces have driven the application of CUD's design features to the educational environment, including,

> (1) the pressures of the expanding diversity of today's student population, (2) the social and pedagogical challenges of integrating digital technology into higher education, and (3) political pressures for greater accessibility and the regional accrediting agencies' evolving mandates for outcome assessment. (Zeff, 2007, p. 28)

By eliminating obstacles to learning, accommodating individual needs, and challenging learners, UDL offers more flexibility in how students access, engage with, and respond to information; it also provides alternative ways for students to demonstrate the skills they have acquired (NCUDL at CAST, 2012). True to Ronald Mace's original concept, UDL benefits all students, not only those with disabilities, with a lack of language fluency, or with weak basic skills.

UDL and Adult Learners Online

Epistemology, Practice, and Justice

The policy environment and the social forces mentioned above create an emergent and dynamic context for the teaching–learning transaction. Responding to this dynamic situation, UDL asks educators to reframe their understandings of knowledge and the way that knowledge is operationalized within the learning environment. Similar to the shift from "the disabled student" to the

"disabled curriculum" mentioned above, this reframing represents an epistemological shift away from stubborn teacher-centered approaches and frameworks to more student-centered approaches and frameworks. In facilitating an epistemological shift, UDL also addresses exclusionary educational practice issues and concomitant social justice concerns. Adult education as a field has long been at the forefront of reconceptualizing the learning transaction: From Paulo Freire's (1972) critique of "banking style" education (p. 58) to Stephen Brookfield's (2001) notion of ideology critique to Michael Welton's (1995) robust critical alternatives to individualistic models of learning, lifelong learning has benefited from creative and useful characterizations of epistemological foundations. With these seminal thinkers, the door has been opened for educators to think differently about how knowledge is constructed. The epistemological shift that UDL facilitates is that the knowledge and truths that humans grow into are not abstract things existing independently of the sociocultural realities of the humans themselves. To teach, to learn, to develop programs and curricula is to engage, develop, and appreciate, not simply the content and learning objectives themselves, but also, primarily, the interaction of learners' unique histories, abilities, cultures, and characteristics. Moving beyond individualistic and behavioristic models of learning requires moving beyond the traditional models of the teaching–learning transaction that continue to be reliant on a dualistic ontological foundation, and epistemologically, a correspondence theory of truth. Modeling instruction as either the sage on the stage or the guide on the side (King, 1993) can buy into an individualistic and behavioristic framework—both immersed in these philosophical fallacies. From an instructional design perspective, "[m]any of the basic assumptions and characteristics of behaviorism are imbedded in current instructional design practices" (Ertmer & Newby, 1993, p. 8). To date, the field of adult education, especially as it is lived out in the online context, has been ineffective in generating the widespread use of methods developed with epistemological diversity in mind. UDL is one strong option for enabling adult educators to practice the diversity that they preach.

Flowing from these epistemological concerns are issues of social justice and educational practice (Agada

1998; Bernal, 1998; Scheurich & Young, 1997). UDL can also help adult educators address these matters. An individualistic model of learning relying on a flawed epistemology reduces education from a teaching–learning transaction to a relationship between things. Michael Welton (1995) has developed this concept more fully as it relates to Habermas' notion of the colonization of the lifeworld. Moving away from this colonization makes adult education more holistic and learner-centered. Education in general, and online adult education in particular, has struggled to actualize its visions of justice. Even though we recognize that education often serves to reinforce existing stereotypes and inequities, change in the direction of greater inclusivity has been slow (Cincinnato, De Wever, & Valcke, 2014; Edwards, 2015; Kvasny, 2006; Naidoo, 2004; Seale, Georgeson, Mamas, & Swain, 2015; Van Deursen, van Dijk, & Peter, 2015). Students with disabilities, language barriers, lower socioeconomic status, and other less traditional backgrounds struggle more in formalized educational settings (Aronson, 2008; Gregg, 2007; Kanno & Kangas, 2014). Traditional curricula and methods, based on individualistic models of learning, cannot ameliorate these difficulties even though we recognize that these difficulties exist (Patton, 2016; Welton, 2014).

Developments in brain science also reinforce this move away from traditional curricula and methods, supporting a UDL approach. The study of neuroscience has determined that there are several networks within the brain that are activated in the learning process,

> one that learns to recognize objects or patterns in the external environment, one that learns to generate effective patterns of action or response, and one that learns to evaluate the significance or importance of the possible patterns we encounter or generate. (Rose et al., 2006, p. 5)

Recognition networks support content acquisition, strategic networks reveal the methods of learning, and affective networks relate to the reasons for learning. These networks reflect the multiple means of representation, expression, and engagement that form the foundation of UDL (Rose et al., 2006).

In terms of educational practice, the reoriented ontological and epistemological foundations of UDL

open new doors as well. The development of UDL as discussed above characterizes an important outgrowth of these different foundations. In particular, UDL guides us to orient our practices around eliminating assumptions of a common background, moving in a learner-centered and collaborative direction, utilizing multiple means of representation, engagement, and expression, and focusing on content relevance, value and authenticity, real-life tasks, and flexibility.

Improving practice through flexibility and reducing barriers

Focusing on flexibility and reducing barriers to learning, UDL acknowledges that students learn differently and suggests that students with sensory disabilities, learning disabilities, and language or cultural differences need learning environments that meet their particular ways of learning. At the same time, neurotypical learners may also comprehend information more quickly or effectively in a visual or auditory format rather than only through textual means; therefore, they would benefit as well from multiple means of representation that encourage making connections between concepts (CAST, 2012). Adult distance learners, in particular, benefit from UDL design features that "disrupt the traditional dependency on text with the thoughtful addition of visual and auditory interfaces which tend to be more inclusive" (Crichton & Kinash, 2013, p. 216), yet course designers must also recognize that some features of online technology can be disabling for students, especially those learners who are not neurotypical, and implementation of UDL is necessary to ensure inclusivity. Two important UDL guidelines include "providing the same information through different modalities . . . [and] providing information in a format that will allow for adjustability by the user" (CAST, 2012). Inclusion of both linguistic and nonlinguistic materials and scaffolding are both important as well.

Learners also need different methods to present what knowledge they have acquired. A student lacking language fluency may have difficulty expressing her knowledge in written words, but she may be effective when she uses visual, oral, or graphical techniques. Varied organizational skills can lead to some learners presenting knowledge in a linear fashion whereas others' thinking is more circular. Students may approach their learning in very different ways as

"action and expression require a great deal of strategy, practice, and organization" (CAST, 2012), and attention to executive functioning differences is significant. The concepts of UDL have also been applied to assessing what students have learned in ways that are not only accessible to all learners but also "authentic, accurate, and authoritative for a student population that is constantly growing in diversity" (Zeff, 2007, p. 41).

Improving practice through cultural and developmental sensitivity

The concepts behind UDL acknowledge that "affect represents a crucial element to learning, and learners differ markedly in the ways in which they can be engaged or motivated to learn . . . including [with regard to] neurology, culture, personal relevance, subjectivity, and background knowledge" (CAST, 2012), particularly adult learners. Corroborating the need for this sensitivity, according to cultural neuropsychology, developmental trajectories are varied even at the societal level, with different societies presenting differentiated patterns (Henrich, Heine, & Norenzayan, 2010). The work of Luria and Vygotsky with the Uzbek population shows the sociocultural embodiment of visual ability when capturing pictorial illusions. It demonstrates how cultural and environmental aspects influence an adult's cognitive skills. In particular, residents in urban versus nonurban environments reveal significant difference in spatial abilities (Ardila & Keating, 2007). For instance, adults in modern urban areas have a stronger tendency to be mediated by maps, charts, and diagrams, which they frequently use on a daily basis, whereas inhabitants in less populated environments such as deserts, jungles, or tundras apply spatial and natural elements for their cognitive process. As such, a cross-cultural comparison between urban and nonurban individuals unveils different perceptual constancy and learning based on living environments (Myambo, 1972). Recognizing that knowledge is constructed by learners in this more holistic manner and acknowledging a subsequent epistemological shift, UDL can provide optional learning materials through multimodal sources of information such as a combination of text, graphics, audio, and video that can best serve the needs of adult learners from diverse social and cultural backgrounds. Acknowledging the various developmental trajectories of adult learners, the

provision of textual, auditory, and visual information resources will foster naturally embodied and preferred learning by allowing active self-customization of materials. For learning to be effective, these kinds of differences must be acknowledged and addressed. The learning materials need to be relevant and in line with the goals of the learner to enhance motivation, and students must be provided opportunities for both spontaneity and routine, independence and collaboration, and instructor direction and autonomy (CAST, 2012). Given the characteristics of various development trajectories of adult learners in general, and adult learners in the online context in particular, incorporating UDL principles is beneficial and moves our educational practice away from individualistic and behavioristic approaches that rely on a false epistemology.

Adult learner/learning characteristics supported by UDL

In the current educational environment, the adult population is called to participate in continuous learning to fit changing market needs and participate more fully in the knowledge economy. Regardless of ability or demographics, adults are pressured to become lifelong learners equipped with technology skills and fluency with information and communication technologies (ICT; World Bank, 2003). Under these circumstances, greater numbers of adults are returning to engage in learning activities, and this also means that there is greater diversity in this population of students (Hannah, 2017; Kasworm, 2003; Willans & Seary, 2011).

Despite the fact that there is not a universal theory to explain how adults learn and that epistemological diversity is a fundamental characteristic of the teaching and learning transaction, UDL provides a broad conceptual framework to accommodate the current diverse population of adult learners. Many returning adult students perform multiple roles and responsibilities while also seeking to improve themselves through lifelong learning. Bounded to multiple duties at home and in the workplace, and having limited time and energy, adults have few chances to fully indulge in learning activities. This lack of individual resources creates pressure and anxiety for adult learners in this situation. Understanding the competing demands in adult learners' lives, UDL can integrate the qualities of informal learning into an

online course. Informal learning is considered "the natural accompaniment to everyday life" (European Commission, 2000, p. 8) and is found to happen in most adults' routines. Unlike formal learning, which takes place under institutional settings, informal learning occurs through "very normal, very natural human activity" (Tough, 2002, p. 2). Even in formal educational settings, informal learning can take place (Jarvis, 2008) through personal interaction and unstructured processes (Gofton & Regehr, 2006) that reflect social norms (Ozolins, Hall, & Peterson, 2008). The qualities of informal learning can enhance the educational experience of an adult learner, but are often ignored as design considerations.

According to Rao (2012), the challenges for adult learners in online courses are threefold: uncertainty about expectations, insufficient learning community, and technology challenges. Lack of face-to-face interactions deprives learners of the opportunity to verify and understand the instructor's expectations. Students can discuss various course-relevant issues from an assignment's approach to course climate through informal encounters and conversations if they meet in a face-to-face class. Also, in a face-to-face setting, personal difficulties and concerns can be shared more effectively to determine a clear response to the expectations of the course. It is not only a sense of ambiguity, but also one's feeling of isolation due to the lack of a learning community that is troublesome to online adult learners. For example, in behavioristic frameworks, students might respond to weekly assignments to complete mandatory tasks rather than engage each other in constructive and collaborative discussions. These challenges are often attributable to the simple use of technology that stipulates work-to-do based on due dates. In response to these challenges, UDL can provide ways to introduce informal aspects into the adult learning sphere by reinterpreting, expanding, and reconstructing the traditional epistemology of the non-UDL online sphere. Consideration of various learning styles and provision of multiple learning options will be the beginning point of accommodating flexible informal learning spheres.

Distance learner/learning characteristics supported by UDL

Because many distance learners are adults and online course offerings provide access to students whose circumstances may limit their ability to participate in

face-to-face classes, it is necessary to understand the variety of students who participate in online learning (Moore & Kearsley, 2011). The flexibility of UDL-designed courses provides opportunities to meet the needs of this diverse population. One reason that adjustability is particularly important in distance education is that the online environment allows students to interact with the content, the instructor, and peers in various settings that may present distractions not found in a face-to-face classroom. Because students taking distance education courses may also be nontraditional students, particularly adults with nonacademic responsibilities in their lives, to be successful, they must be self-directed, motivated, and interested in their own learning. Motivation is an important requirement for successful online learning, and following the UDL model with multiple forms of engagement is effective. Distance education teachers serve a somewhat different role than traditional instructors and students are much more autonomous. Learners also have more control of their learning in an online environment and make their own decisions about how to learn. Because there is no single best method for students to access content and reveal their understanding, UDL's focus on providing options is significant. It is important to recognize that adult distance learners want to exercise control over their own learning, define what it is they will learn, make their own decisions about how to learn, use their personal life experience in the learning process, apply their knowledge to solving real-life present-day problems, and have intrinsic motivation (Moore & Kearsley, 2011). Because of the diversity of distance learners and their autonomy, providing multiple ways to acquire knowledge and demonstrate comprehension is beneficial.

Moore's (1993) theory of transactional distance highlights the separation of the student from the instructor that is both physical and psychological. Teachers and students navigate this separation in very different ways; "[e]ven though there are clearly recognizable patterns, there is also enormous variation in these strategies and techniques and in the behaviour of teachers and learners" (Moore, 1993), thus supporting the principles of UDL. In designing distance learning experiences, Moore argued that there must be a focus on structure, dialogue, and learner autonomy with particular emphasis on the processes of presenting content, supporting student motivation, developing critical analysis, giving supportive and clarifying guidance, assessing learning, and creating knowledge (Moore, 1993). Multiple means of representation, expression, and engagement are essential elements of each process. Friesen and Kuskis (2013) considered both pedagogy and technology in terms of online interaction and concluded that "the mediated context of distance education has compelled distance educators to consider more seriously interactions between students and diverse educational media" (p. 351), focusing on student interaction with content; however, multiple effective communication options also enhance the development of positive social presence that increases learning. When designing a course using UDL, flexibility and choice can enhance interaction so that it meets the goals of distance educators and fulfills instructional objectives, addresses student diversity, and increases access (Friesen & Kuskis, 2013). Because effectively designing a distance education course does not mean simply transferring face-to-face content and activities to an online format, but requires rethinking and redesigning (Dennen, 2013), UDL can be a useful tool for instructional designers. CAST emphasizes the need to apply UDL by "building courses and classroom activities from inception to meet the learning needs of the greatest number of students" (Zeff, 2007, p. 30).

The role of the teacher in distance education matches particularly well with the fundamentals of UDL as adult distance learners demand that "teachers gain authority from what they know and the way they deal with their students, not from any external symbols or titles. Physical distance tends to further reduce the dominant psychological position of the teacher" (Moore & Kearsley, 2011, p. 151). With UDL, the instructor, with content and pedagogical knowledge, designs a course that allows the students to determine what and how they will learn. Elements of online courses that contribute to student success such as applicability and relevance of content, prompt and meaningful instructor feedback, and clear, easily understood guidelines, course materials, and assignment parameters (Moore & Kearsley, 2011) are highlighted when UDL principles are employed effectively.

Applying UDL Principles to an Existing Online Course

What follows is an example of how UDL principles were applied in redesigning an online course. An

important element in applying UDL is that it begins with course design, "building out curriculum and lessons from a set of goals" (Zeff, 2007, p. 30), rather than trying to meet the needs of diverse students only when problems develop. The principles of UDL can be applied to course objectives, teaching techniques, learning materials, and assessment methods, so that no matter what skills, needs, motivations, or interests an individual student brings, she will be able to learn.

The purpose of the course that was redesigned is to introduce future teachers to principles of effective communication in ways that educators will typically experience. It included the design and presentation of individual speeches, videos, and other common forms of educational communication. Assessment included evaluation by examination, product review, and other activities focused on the use of communications for educators. Students learned about a variety of communications technologies that are specifically useful for teachers within the framework of a deeper understanding of basic rhetoric including rhetorically effective communication. The goal of the course is to master the process of communication within the pedagogical setting. In evaluating the effectiveness of the course, we noted a lack of flexibility and limited options available to diverse students. We planned revisions that would strengthen learner engagement, increase performance, and meet the needs of all students. We recognized the need for shifting the instructional focus away from a traditional behavioristic methodology that accommodates individuals viewed outside of the norm to one that addresses the needs of all learners in increasingly diverse classes. We followed the model of Rose et al. (2006) in their redesign of a graduate education course. In following this approach, the movement beyond an individualistic and behavioristic learning environment takes priority as the UDL framework allows learners' unique histories, abilities, cultures, and characteristics to become opportunities rather than deficiencies.

Text choice

After reviewing the presentation of course information and content through the lens of UDL, we realized that it did not provide multiple means of representation, and it also did not contribute to student motivation through multiple means of engagement. It did not meet Mace's first principle of design of

providing accessibility to individuals with varied abilities as the need for accommodating assistive devices such as a text reader would segregate and possibly stigmatize specific students (Story et al., 1998).

The written text did not meet the needs of all students, even if it was used with a text reader. Students need options for accessing the course content. Visual representations can enhance learning for some students. When applying UDL, it is important to recognize that merely adding a text-reader function or closed captioning a video is not a significant way to address disability and diversity. The new book options for the course offer multiple means of representation as students may read a traditional text-based work, listen to a text reader, study from an outline and visual version of the book, or use a Kindle reader format. Each version of the content provides an option for a different type of student. The images of the books we provided on the syllabus also provide a link for purchasing the book.

Syllabus format

The syllabus also did not offer multiple means of representation and engagement. We needed to provide information, particularly about assignments, in different ways that were more stimulating to students. It was clear we had to revise the syllabus to meet Mace's principles. It needed to be "eas[ier] to understand, regardless of the user's experience, knowledge, language skills, or current concentration level" (Story et al., 1998). We focused revisions on simplifying the document, making it more intuitive, and rearranging the content to reflect its importance, thus accommodating a much greater range of student abilities (Story et al., 1998). To enhance the communication of information, we "[used] different modes (pictorial, verbal, tactile) for redundant presentation of essential information . . . [m]aximize[d] 'legibility' of essential information . . . [and] ma[d]e it easy to give instructions or directions" (Story et al., 1998). The original syllabus was entirely textual, presented in paragraphs and lists; it required constant scrolling to identify needed information. It did not engage the students. Visual elements, such as book cover images, were added to engage the students. An interactive course calendar, text and content links, and navigation arrows were provided to make it easier to find necessary information. Color was included to

visually separate and emphasize sections of the document. An effort was made to effectively create a community by adding instructor photographs and an inspiring message.

Assessment values and descriptions

It was also important to look at multiple means of representation with regard to assessments. Although there were written descriptions of the assessments and a breakdown of grade percentages, the assessment summaries and directions did not provide an excellent model or an unacceptable product. Explanations about what to do for specific assignments created confusion and increased anxiety; these statements led to repeated mistakes and low performance. Students did not correct their mistakes even after receiving feedback on previous work. A color-coded pie chart was added to highlight the grade percentages for assessments, making their worth instantly visible. Rubrics and model student assignments were included to increase student understanding of expectations. Visual models were created to demonstrate standards. Feedback was provided numerically using the rubrics and simultaneously with individual comments.

Assessment methods

Two factors we considered when evaluating assessments were multiple means of expression and engagement. We needed formats that stimulated student interest and motivated them to meet high expectations. In this area, flexibility, Mace's second principle, was key (Story et al., 1998). We wanted to meet the needs of students with diverse abilities and varied interests. Providing students with multiple options to show what they knew was essential.

Originally a multiple choice midterm and final exam were offered as assessments of course content knowledge acquisition. These were the only summative assessments. Because the course was online, it was easy for students to use outside resources when completing the tests so the scores were inflated and did not reflect students' actual content comprehension. A new assessment strategy was used that reflected more problem-solving and real-world connections. As education students preparing to teach in their own classrooms, students designed their own tests from a class-generated question list and provided a justification for their choices. The class list of questions

was expanded weekly and students' individual contributions were graded, so students received feedback on the topics prior to the final test creation. This assessment effectively used collaboration and scaffolding.

Communication with students

As we worked to improve the course, by focusing on the principles of UDL, we recognized deficiencies that had not been obvious to us. For example, this course was designed to teach effective communication techniques, yet our own communication was weak. Acknowledging the need to increase instructor presence in this online course, and thereby enhance student engagement, we implemented several ways to communicate with students. Mace called for "effective prompting and feedback during and after task completion" (Story et al., 1998). We accomplished this through weekly class emails, weekly individual emails providing feedback on discussion forum participation and homework assignment completion, and regular updates to content clarifications and assignment details and models.

Conclusion

In the interest of greater accessibility, effectiveness, and enjoyment of the learning process for all learners, UDL offers principles and practices that shift to a learner-centered approach and emphasize collaboration and community. UDL represents an epistemological shift away from individualistic approaches to the teaching–learning transaction, allowing course design and educational practice to directly address issues of justice and inclusion. Through the guiding principles of multiple means of representation, multiple means of action and expression, and multiple means of engagement, UDL encourages the design of learning environments that can accommodate the increasing diversity in the growing population of adult learners, particularly in the online context. In this way, UDL is also a justice-oriented approach, creating greater opportunities for success for broader swaths of the lifelong learning population.

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