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Postsecondary E-Learning for Students with Learning Disabilities

Online learning in postsecondary education is ubiquitous. Some courses are face-to-face, with virtual components, while others are entirely web-based. Learning management system (LMS) tools can be synchronous, in real-time, or asynchronous, which time-shifts interactions. If a student is self-disciplined, he or she can review course material as much as needed before interacting in class discussions. A self-paced educational setting can be helpful to some students with learning disabilities; however, the lack of structure may not help others.

There is a growing amount of research pertaining to assess how students with learning disabilities perform in higher education. Unlike kindergarten through grade twelve (K-12) schooling, there is no standard model or framework utilized by higher education faculty. Similar to its "brick-and-mortar" counterpart, postsecondary online learning should take into account the diverse needs of its student population. The efficacy of postsecondary e-learning for students with learning disabilities is just beginning to emerge.

Accessibility is a civil right. It is under the purview of the United States Office of Civil Rights (OCR). Legally, e-learning providers must meet specific obligations to ensure that distance learning is accessible to the entire postsecondary student population. Section 504 of the Vocational Rehabilitation Act of 1973 applies to online learning. It specifically prohibits discrimination based on disabilities. This includes "public postsecondary institutions that receive any type of federal funding" (Crow, 2008, p. 170). The third applicable law is the Assistive Technology Act of 1998. This ruling awards

funds to institutions so accessibility tools can be purchased (Crow, 2008, p. 174). Other laws include the Rehabilitation Act of 1988, which was amended to include Section 508: Technology purchased with federal dollars must be accessible to all (Hashey & Stahl, 2014). The passage of the Americans with Disabilities Act (ADA) increased federal mandates.

The most pervasive framework used to meet federal mandates is universal design. A review of literature shows much more research on the application of the Universal Design for Learning (UDL) Guidelines than the Principles of Universal Design for Instruction (UDI). This is interesting to note because UDL was intended for kindergarten through grade twelve (K-12); UDI was created for postsecondary education. The literature also suggests that online learning often extends beyond the LMS to the Web, as well as offline applications, like word processing tools. Web-accessibility standards, therefore, must be put in place. Failure to do so could bring litigation from learning disabled students (Crow, 2008, p. 176). Furthermore, it shows that the institution is committed to lowering barriers to accessibility for the entire student population" (Crow, 2008, p. 176).

Review of Literature

A case study was conducted to assess whether the UDL Guidelines was effective in higher education. Although the population size was small (five students), the findings are interesting to note; it was among the few to take into account the student point-of-view. Much of the recent literature measured faculty proficiency in designing accessible courses. Qualitative data was collected via face-to-face interviews. The Louisiana Center for Dyslexia and Other Related Disorders was also consulted. Several assistive

applications were studied, including text-to-speech readers, textbook websites, and recorded lectures. The researchers were surprised to learn that "none of the participants found the audio to be of any assistance to their learning experience" (Simoncelli & Hinson, 2008, p. 54). Interviewed subjects reported that too many technical problems existed in downloading the modified material. Students reported more successes with asynchronous discussion board posting, as well as text-to-speech document readers. Similar to other research, more professional development for faculty was recommended (Simoncelli & Hinson, 2008).

In 2006, a Canadian study of 223 students with learning disabilities was conducted. Professors and service providers also participated. Online survey questions assessed accessibility of LMS tools. At least one problem was reported for every question category. For example, participants "complained of the inaccessibility of websites" (Fichten, et al, 2009, p. 250). In other words, even if the LMS was accessible, related websites were not. Many students saw no resolution to website access, either. Typically, instructors designed the courses. Therefore, faculty may simply require training on available LMS features, like chat and video, as well as web accessibility. Professional development was recommended (Fichten, et al, 2009).

Researchers at the University of Alaska conducted a study of tenured and adjunct faculty. The purpose was to assess the accessibility of online, postsecondary learning for learning disabled students. A web-based questionnaire was conducted. The results suggest that better communication between stakeholders is needed. About half of the respondents were informed by their institution – or by the students themselves – about how to address disability issues. Almost a quarter of the surveyed faculty failed to

mention available university disability services in their course syllabus. About two-thirds of faculty reported that they were never trained on e-learning accessibility. The researchers next transposed the Universal Design for Learning (UDL) Guidelines onto LMS courses. Just over one-third of the participants had ever heard of the UDL Guidelines. In addition to the need for training, researchers recommended increased use of multimedia tools, including screencasting and podcasting (Gladhart, 2010).

E-learning can enable students to use their own organizational methods. In a qualitative study, students with attention deficit hyperactivity disorder (ADHD) were interviewed. Participants were enrolled in postsecondary mathematics, biology, and chemistry classes. "Themes" to answers were parsed out, including the ability for students to be organized (Graves, et al, 2011, p. 323). The findings reported, "all of the participants perceived clarity as a key component in their learning process" (Graves, et al, 2011, p. 324). In other words, if the course was designed clearly, students with ADHD could follow. Self-paced learning enabled the participants to review material at their own convenience, which built up students' confidence to succeed (Graves, et al, 2011).

A 2011 report recommended that instructors test accessibility in advance of a course's start. This will help avoid future problems for students. For example, a scanned page might seem accessible for students with difficulty reading; the words can be resized with in a reader. Scanning, however, is often an image of a page's text. The resulting document would not work with a text-to-speech reader. Learning online can also lower barriers to class participation. Students with learning disabilities may be shy to participate in face-to-face settings; however, online discussion boards are asynchronous, allowing students to join in at their own pace. Coursework can be chunked into smaller

blocks, thus alleviating the need to sit for long periods of time. Of course, self-pacing is only an advantage if the student has a strong independent work ethic. The researchers recommended that instructors take time to assess the usability of each accessibility feature (Case & Davidson, 2011).

Reading online presents challenges to students with learning disabilities. Researchers conducted audio-recorded interviews from learning disabled participants in postsecondary education. Results were coded to match whether the e-learning experience was "successful" or "not-successful." Questions measured the intuitiveness of online courses, including webpage navigation and layout. The findings suggested that students who already experienced online learning were better suited to function in subsequent e-learning settings. The most frequently problem reported pertained to reading large amounts of text on a computer screen. The findings extended beyond the courses (and the LMS tools) to university online library databases. Gleaning over multiple articles on a video monitor can be particularly challenging (Hollins & Foley, 2013).

Technology changes at a much faster rate than research. Furthermore, LMS tools are iterated frequently, adding in more and more multimedia features. High speed Internet has become more pervasive, as well as access to the mobile and social web. Little data exists reporting on how technological advancements help students with learning disabilities.

<div align="center">Proposed Solutions</div>

Universal design is an approach to meet the needs of all students. It is a "construct from architecture and product development" that has made its way into education (McGuire & Scott, 2006, p. 124). A ramp on a sidewalk is an example of

architectural universal design. Its use transcends its original intent: helping people in wheelchairs to move onto or off of a sidewalk. Parents with strollers also use sidewalk ramps. Another example is sound enhancement in a classroom. All students may benefit, even though its installation was intended for just a few in the classroom. In the late 1990s, the Center for Universal Design created a seven-principle framework, "to guide designers as they create accessible spaces and products" (McGuire & Scott, 2006, p. 125).

Because online instructors may not be cognizant UDL Guidelines is one of the more widely used methodologies. The framework was finalized in 2006 and remains popular to this day. Instruction should include: "multiple means of representation, expression, and engagement" ("CAST: Center for Applied Special Technology," 2014). It was not intended specifically for special education, but for all learners. The UDL Guidelines were mentioned in several research studies regarding e-learning; however, "its primary focus [is] on K-12 students" – not postsecondary learners. Nonetheless, postsecondary instructors can utilize resources on the Center for Applied Special Technology (CAST) website to ensure that all students needs are met.

In 2001, University of Connecticut researchers Joan M. McGuire, Sally S. Scott, and Stan F. Shaw proposed UDI Principles. It pertained specifically to higher education. Similar to the UDL Guidelines, it focused on instructional delivery methods. UDI assumes all students are diverse. UDI Principles are designed to "inform selection of instructional strategies, suggest additional learning approaches for students, and increase awareness of potential barriers in the content process demands of a class" (Dukes, Koorland, & Scott, 2009, p. 41). There are Nine Principles of UDI, including creating an

intuitive experience for students and encouraging the formation of learning communities (Dukes, Koorland, & Scott, 2009, pp. 42-45). The UDI Online Project, hosted by the University of Connecticut, defines each and provides examples of use. While helpful, the review of literature showed little data on its application.

Online courses use a wide spectrum of application and websites, including YouTube, Slideshare, Panopto, and PowerPoint, and other tools. Some are standalone products, while others are packaged within the LMS. The Center for Online Learning and Students with Disabilities (COLSD) provides guidance for web-based applications. Although intended for K-12 education, it is a helpful resource for postsecondary faculty. COLSD hosts webinars and provides free resources to help guide online learning accessibility. The Voluntary Product Accessibility Template (VPAT) is another useful resource. It is a federal guide to ensure that students of all needs are able to access online learning. As the name implies, it is voluntary. Similar to the UDL Guidelines, VPAT provides an assessment rubric to ensure that information reaches students (Hashey & Stahl, 2014). COLSD maintains a listing of VPATs for popular tools (e.g., VoiceThread, iMovie). Similarly, Web Accessibility in Mind (WebAIM) offers free resources for Internet sites. Researchers recommended that faculty needed to be more aware of LMS accessibility features. Furthermore, instructors must learn about related applications' accessibility functions, like text-to-speech options in Microsoft Word.

Researching VPAT and WebAIM for every possible course application can seem like an insurmountable task. Instructors would need to review VPAT tools specific to the application they are asking students to use. It may not be possible to know if a student is using Word, Pages, or Google Docs as a word processing tool; each has a different

VPAT. In a perfect world, faculty should review accessibility for tools outside the course. The reality is more sobering; time constraints and lack of training impinge of implementation. Further exacerbating matters is the lack of some LMS tools (e.g., Blackboard Learn) to show a "student view" of a course. As a result, faculty may not realize how the LMS appears to students. Therefore, professional development training, as well as a "student view" option of courses, should be available. The university's online learning department should also aggregate and post a list of VPAT and WebAIM resources.

Disabilities, including ADHD, can be difficult to overcome if the student has to take notes in real-time. Online learning can be static and hard to follow. This is especially true if a course lacks multimedia elements. The teacher is typically the person responsible to plan and execute the method of instructional delivery. Therefore, they should take advantage of the many tools that can make e-learning feel more personalized. Multimedia and asynchronous teaching methods can be beneficial for students with learning disabilities.

The university or the student himself or herself is not always obligated to share learning disability information with faculty. An online instructor may never be told a students' individualized needs. Therefore, course delivery must cater to all learning styles. Ultimately, using a wide range of LMS tools falls on the instructor. Because postsecondary faculty often designs e-learning experiences, a need for more training exists.

Student-Centered Universal Design for Accessibility (SCUDA) Model
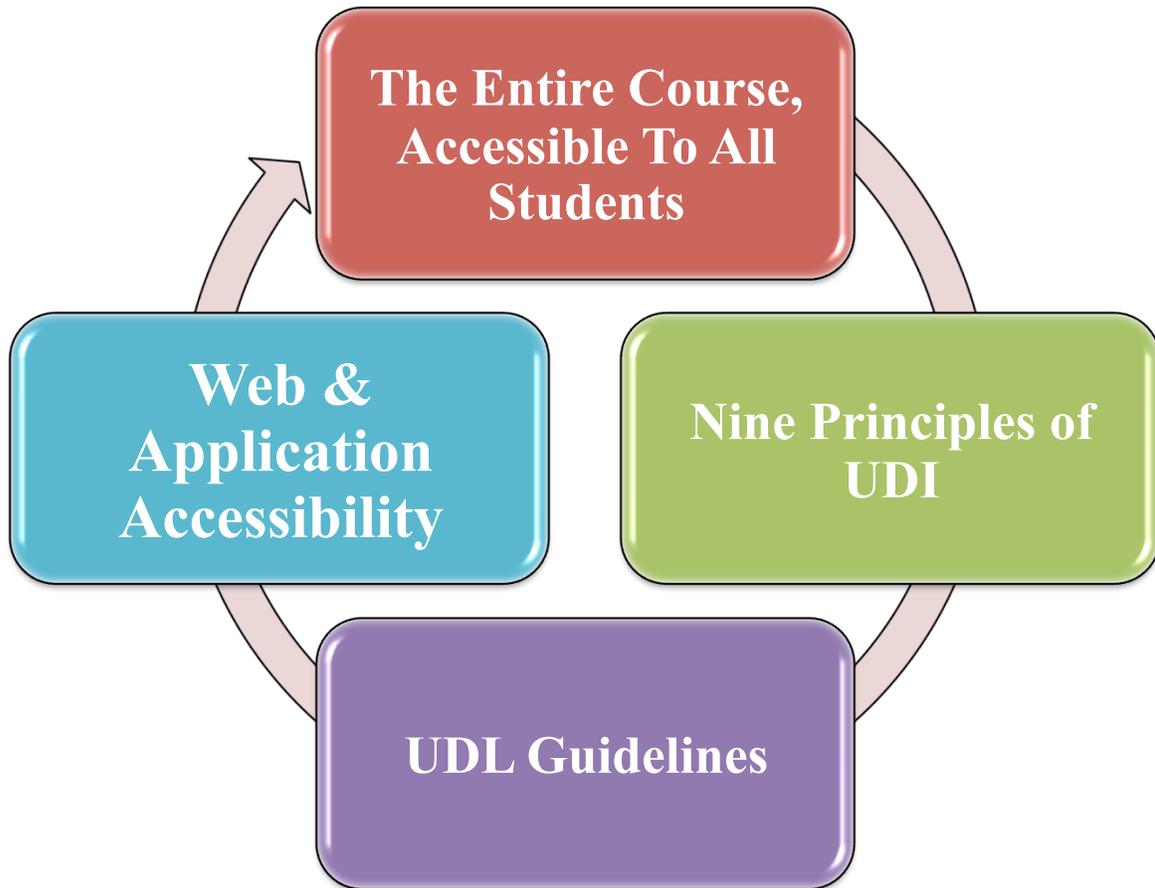
SCUDA Model Notes:

- Instructors may not know learning disabilities of students; therefore, the entire course should be accessible for all.
- It is recommended that instructors have a "student view" of courses.
- Mutual instructor-student feedback is recommended; technology changes rapidly.
- Faculty professional development training is recommended.
- The institution's department of online learning should post the following links on its LMS homepage:

    o The Nine Principles of UDI: http://udi.uconn.edu/index.php?q=node/12
    o UDL Guidelines:
       http://www.udlcenter.org/sites/udlcenter.org/files/updateguidelines2_0.pdf
    o VPAT Resources at COLSD:
       http://centerononlinelearning.org/resources/vpat/
    o WebAIM: http://webaim.org

Journal and Conference Submission

The researcher will submit this paper to the International Journal on E-Learning (IJEL) (http://www.aace.org/pubs/ijel/). He has been previously published in the Journal of Interactive Learning Research (JILR), a sister publication of IJEL. Both are under the purview of Association for the Advancement of Computing in Education (AACE). The researcher has a degree of familiarity of the journal's requirements for publication, as well as its ranking as a well-respected publication. IJEL is published quarterly. It is peer-reviewed and has about a 20% acceptance ratio.

The AACE hosts several conferences each year, including SITE and E-Learn: The World Conference on E-Learning (http://www.aace.org/conf/elearn/). The cut-off date to participate in E-Learn, scheduled for October 27-30, 2014, is September 3. The researcher will submit this paper as a Conference Poster. The intent is to share the need to aid postsecondary faculty on available tools to mediate accessibility for students of all abilities. The research is formatted in the style mandated by the AACE.

The increasing population of e-learning for students with learning disabilities will present legal and ethical challenges to postsecondary faculty and institutions. Furthermore, students and universities are not necessarily obligated to share special education requirements with instructors. Therefore, courses should be designed to reach as diverse a population as possible. The purpose of this paper and subsequent conference workshop will be to share applications of the UDI Principles and other web accessibility templates (e.g., WebAIM, VPAT). Unlike the UDL Guidelines, it was designed and intended for higher education. The resulting SCUDA Model, which is dependent on student feedback, will be presented as an equitable solution.

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