Merging Educational Technology and Accessibility

Introduction

One of the deciding factors for choosing the Boise State University’s (BSU) Educational Technology (EDTECH) graduate program was the opportunity to connect assignments to various work projects. My expertise in document and video accessibility provided a nice foundation for growing into the educational technology field. Considering the digital accessibility field is newer, and does not have a vast amount of research, learning the theories, practices and research of educational technology provided a professional cornerstone that was missing. Now, I will have more skills to help create inclusive online content, instead of simply remediating it. The purpose of this paper is to highlight the top lessons learned during these four years.

Lesson One: Reflections on Learning

The EDTECH program has reinforced for me, the importance of using universal design for learning (UDL), because the learner population is diverse, and students with disabilities are often overlooked in course design. Universal design for learning is a philosophy and framework by which to design educational materials that are usable for all (Roberts, 2011). Specifically, UDL describes three tenets: multiple means of representation, multiple means of action and expression, and multiple means of engagement (Meyer, Rose, & Gordon, 2014). Providing
multiple means for representation, action, expression, and engagement is imperative as each individual lives on a spectrum of ability regarding vision, hearing, physical movements, cognitive differences, reading, writing, etc. Educators cannot assume that all students are the same regarding their physical and mental abilities. Additionally, research in neuroplasticity (brain's ability to form new neural connections, thus changing itself) challenges the assumption that brains are static (Doidge, 2007). Neuroplasticity demonstrates neurodiversity; both substantiate the validity of universal design for learning:

> Although human brains all share the same basic recognition architecture and recognize things in roughly the same way, our recognition networks come in many shapes, sizes, and patterns. In anatomy, connectivity, physiology, and chemistry, each of us has a brain that is slightly different from everyone else’s. (Rose & Meyer, 2002, p. 17).

Simply summarized, UDL applied to education means that curriculum is designed with the spectrum of abilities (like see, hear, speak) in mind. Universal design for learning demands that documents, videos, tasks, assignments, and evaluation focuses more on achieving objectives than the tools or methods used to reach those objectives. For example, an objective may be to demonstrate competency in reading Thai at a level 1. For a blind student, that could mean reading Thai Braille, whereas a sighted student would read a hardcopy book. A universally designed class would have a Thai Braille version of reading materials available. If that is not possible, then that class would have electronic versions of the reading materials that are easily turned into Braille.
Lesson Two: The Art & Science of Teaching

Perhaps the most exciting idea regarding the art and science of teaching is gamification. Gamification is the idea of applying principles from playing games into the educational arena. This is a more modern area of study, and research regarding board games and other types of games is applied to the digital sphere. Whitton (2012) stated that “learning in the future cannot simply be about memorising facts, or even applying those facts, but it has to focus on how to learn and strategies for managing the unexpected” (p.184). Kapp (2012) described gamification in both depth and breadth in their work, *The Gamification of Learning and Instruction*. One particular aspect is the discussion of play in learning. Humans have been learning by play since infancy. In the 1930s Vygotsky wrote “play is not the predominant feature of childhood, but is a leading factor in development” (p. 14). These points are applicable to adult development as well. Play (in the form of games) includes a goal, rules, feedback, rewards, challenges, etc. Play is known to many and comfortable for most. Games are a known way to engage humans; the challenge is to apply gamification elements to education in ways that meet learning objectives.

Before this program, I did not value games highly, mainly seeing them as a form of recreation. My opinion has changed dramatically as I have fallen asleep thinking of ways to use gamification principles to improve real issues in learning. It was during the Digital Engagement course that I started to become aware of how many ordinary things had a gamification element. Examples include, but are not limited to my airline mileage plan, my rewards credit card, an accessibility evaluation product, and my car mechanic rewards club.
Lesson Three: The Design and Evaluation of Instruction

During this program, I experienced an intellectual crisis upon learning about the Cognitive Theory of Multimedia Learning (CTML). This crisis has caused me to re-evaluate how I design materials. CTML has evolved over decades but currently incorporates four theories: dual-coding, working memory, cognitive load and generative theory (Mayer, 1997, 2002). To summarize, dual-coding emphasizes the dualistic nature of processing information; working memory explains how memory influences the learning process; cognitive load states that there is limited capacity within the brain to process information; and generative theory aims to make sense of the presented material through organizing and integrating information (Sorden, 2012).

As one who works in disability services and who studies educational technology, I grappled with the tension between Cognitive Theory of Multimedia Learning and Universal Design for Learning (UDL). CTML ultimately provides a framework by which to create quality instructional multimedia that promote learning. One aspect of CTML appreciated by disability practitioners, is the emphasis on a learner-centered approach, which asks how multimedia can be adapted to aid cognition (Mayer, 2009). This approach alone allows for flexibility in use and emphasizes the human experience--a profoundly important aspect when creating materials for students with disabilities.

However, as a disability service practitioner, my responsibility is to assist instructors to retrofit academic documents and videos. This retrofitting is to meet the legal mandate of the Americans with Disabilities Act to prevent discrimination against students with disabilities. Essentially, I am learning a framework by which to create instructionals materials that creates some barriers for the students I serve. Despite exploration, I still remain unclear how to incorporate the substantial research of Mayer’s CTML with the UDL framework. Hence, the
intellectual crisis and realization that if I ever wanted to resolve this tension, I would likely need to obtain a PhD and write a dissertation on these topics.

**Lesson Four: Networking and Collaboration**

The most time-intensive artifact I created in this program, the [EDTECH 512 – Online Course](#), demonstrates the positive effects of collaboration. This online course helped to address training issues regarding consistency and quality as student employees converted textbooks into accessible formats for students with disabilities. Over six years, over 50 student workers have been part of this team. It was imperative that industry and team-specific knowledge was not lost from generation to generation. The course is fairly text heavy, but contains appropriate screenshots and videos have been added as needs have been identified. Although this course has changed significantly in content since its initial inception, the artifact is still in use today by the team of student employees I used to manage.

This artifact is a manifestation of the social constructivist theory in practice. Whitton (2014) explains that the social constructivist theory focuses on the importance of constructing shared meanings and understandings with other people (p. 55). Additionally, the theory highlights that students can learn more under the mentorship or guidance of others with more advanced understandings or knowledge, and that learners can only progress within a certain range with support from others (pp. 55-56). The social constructivist theory had a significant impact on a complex, large team.

While I created the initial content, it was reviewed and edited in collaboration with select team members to ensure the content would be beneficial and useful to current and future team members. This process involved several meetings where I sat side-by-side with the select employees and reviewed content, graphics, layout, and topics. We were able to create a common
language and understanding through these hours of painstaking joint editing. It was this experience where questions were answered, best practices were identified, and advanced knowledge was shared.

Constructing a resource together naturally leads to added insight of the other parties, as well as an improved mutual understanding. Due to time constraints, it was often in these editing meetings where advanced knowledge was transferred to key team members, who were able to disseminate the information to their peers. Despite the intelligence of the team members, there was a limit as to how much they could learn by themselves. Their knowledge was greatly increased from these interactions regarding how to make their documents accessible.

Additionally, this collaboration also increased team morale as individuals contributed in meaningful ways to the future operations of this team. Converting materials can be mundane and the opportunity to contribute to a common resource was invigorating.

A collaboration tool that has been extremely effective is Microsoft Teams. It is similar to Slack, but is designed to be an alternative to email correspondence, heavily utilizing features like discussion board, real-time chat, and shared document spaces. This was implemented in Fall 2017 as the size of the team grew from 15 to 26 employees. These employees were students, working varied schedules, both in-person and remotely. Sometimes employees would never overlap in-person but worked together on time-sensitive projects related to legally-mandated accommodations. Information became lost in email, and not everyone had appropriate access to current or previous conversations. As we considered various collaboration tools, we identified the objectives this software would need to address. Then we explored a couple of options, choosing to implement Microsoft Teams. It has been a resounding success: team members can directly message each other, there is a recorded history, it was available to all through their
Office 365 accounts, and a mobile app could be installed for those who wanted to stay in contact while on the go.

**Lesson Five: The Research-Practice Connection**

The research artifacts were arguably the most valuable aspect of the program for me. This is due to the limited exposure to produce empirical works. The artifacts that best exemplify the research-practice connection were the [EDTECH 535 – Research Study](#) and the [EDTECH 551 – Grant Proposal](#). Both were created during the same semester and the nature of the assignments reinforced my learning. Both focus on ways to improve accessibility at my previous institution.

Unknowingly, many higher education instructors are creating barriers in their digital content for students with disabilities. The research study and grant proposal focus on inaccessible documents which include: Word documents (.doc or .docx), Portable Document Files (.pdfs), PowerPoints (.pptx), and text files (.txt or .rtf). Instructors are content curators in the sense that they create, find, acquire, and/or distribute files for their students to consume as part of their academic experience. This is a growing issue because, according to the National Center for Education Statistics (2013), 11 percent of undergraduate students identified with having a disability in 2007-08 as well as in 2011-12. Additionally, the Institute for Higher Education Policy reports “about 9 percent of all undergraduates in higher education report having a disability, a percentage that has tripled in the last two decades. This amounts to about 1.3 million students” (2004, p. vii). There are simply more students with disabilities who are participating in higher education. Allowing inaccessible documents, which are barrier to learning, is no longer acceptable.

Unfortunately, formal discrimination complaints are becoming more common across higher education institutions. In 2016, the U.S. Department of Education’s Office for Civil
Rights received over 4,800 disability-related complaints which equates to 46% of all requests received (Diament, 2016). The consequence of these complaints may result in resolution agreements, which institutions use as guides for identifying discriminatory aspects of the educational experience. Many administrators, and disability professionals, refer to these agreements as a way to plan and strategize proactive adjustments to the campus environment and culture in hopes of preventing such a complaint. Often, these resolution agreements are a catalyst for major change at an institution in favor of students with disabilities.

Ideally, instructors would use accessible documents, or documents that can be used by everyone without retroactive adaptation. This philosophy is referred to as UDL. The purpose of the research study is to (a) identify the top accessibility issues in documents at one specific higher education institution, and (b) demonstrate how gamification principles could address this issue. Understanding the barriers instructors face in creating inclusive content is important for higher education institutions to provide centralized or institutional support. Producing inaccessible content is a clear act of discrimination against students with disabilities, and often makes learning more challenging for students who may not identify as disabled.

Using the results from the research study, the purpose of the grant proposal is to identify the top accessibility issues regarding documents at my previous institution, and to offer three methods for improvement. This grant proposal is designed to be given to higher education administrators as they consider demands on budget, staff, and resources. It outlines the purpose of the proposal, the data that communicates urgency, and options for how to proceed. Both of these artifacts taught me the importance of communicating the problem, current state, and actions for taking next steps in a succinct fashion. This skill of collecting data and information and organizing it in a digestible manner became imperative as I was invited to present to the
Assistant Vice Provost and other campus leaders regarding document inaccessibility. As I have moved into a consulting role at an educational technology company, these skills are utilized on a weekly basis as I prepare reports documenting similar aspects of the research study and grant proposal.

Closing Thoughts

As previously alluded, BSU’s EDTECH program reinforced a passion for inclusivity in the digital world. Specifically, my desire to merge the accessibility and instructional design industries (where appropriate) has cemented. I received countless opportunities to educate my peers and instructors regarding accessibility. I attempted to model, whenever possible, how assignments can both meet the rubric criteria and be usable for students with disabilities. I recognize that there is significant work to be done as instructional designers become more inclusive, and as campuses institute better instructional design. These industries are cousins, if not siblings with respect to their similarities. I dream of a world where any student, despite ability regarding vision, hearing, physical movements, cognitive differences, reading, writing, etc., has the same opportunity to succeed in any educational environment, independently and without course remediation or individualized accommodations.

In full recognition that this is perhaps an unrealistic ideal as of 2018, there are some steps that I plan to take to work towards this utopia. While not a comprehensive list, these are clear strategies that I can take:

- Obtain more experience regarding instructional design through contract work.
- Continue to support and educate instructional designers who are in my circle of professional influence.
- Participate in instructional design listservs, professional groups, and conferences.
● Develop free resources explaining how to implement inclusive instructional design.

● Partner with entities like Teach Access to add in accessibility curriculum into existing higher education courses.

● Publish data and strategies that can read instructors and instructional designers regarding inclusive instructional design.

I have been extremely blessed throughout this entire experience. This program has been instrumental in positioning myself in a manner that I can do meaningful, rewarding work that can be applied in countless ways. Thank you.
References


