

A CONCEPTUAL FRAMEWORK FOR BUILDING UDL IN A SPECIAL EDUCATION DISTANCE EDUCATION COURSE

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ABSTRACT

Online graduate programs have been increasing in number and attendance over the past decade. Ensuring that the quality of teacher preparation programs is maintained in an online learning environment is essential. After reviewing the pedagogies of both special education and online learning, it was determined that Universal Design for Learning (UDL) was the best framework for developing a new graduate online course in a distance learning program. The goal is to highlight a model for designing an online course within a special education teacher distance education program and embed UDL principles within the project. This research adds to the body of literature on distance education and the potential for future research is discussed.

Keywords: distance education, online learning, teacher preparation, online course template, special education online, universal design for learning, UDL higher education, UDL distance education

INTRODUCTION

In the United States, special education continues to experience a critical shortage of personnel who are qualified to teach children with disabilities (Robertson & Singleton, 2010; Smith, Robb, West, & Tyler, 2010). According to Bureau of Labor Statistics from the U.S. Department of Labor, special education teacher positions are expected to increase slightly faster than the average for all occupations (14 %) at a rate of 17 % from 2012 to 2020 (U.S. Census Bureau, 2012). With the growing need for special educators, teacher preparation programs have spread to online formats as a way to reach and prepare preservice teachers in special education. It is important to understand both special education pedagogy (teaching skills for special education) and distance education pedagogy (best practices for delivering instruction online) and the best way to bridge both to effectively prepare special education teachers in online and distance education programs.

There are two primary reasons for studying

pedagogy in order to better deliver special education teacher preparation by distance means. The first is that there are a number of approaches to the preparation of special educators. However, it is safe to say that current university teacher preparation programs have not sufficiently met the need for the quantity or the quality of special educators who are qualified to provide instruction to students with disabilities. Special education has ranked in the top percentile of shortage areas for the past two decades (U.S. Department of Education, 2012). For university special education teacher preparation programs, this shortage means there is a need to introduce different processes of preparing special education teachers. And while some believe that online teacher preparation is a significant development for teacher preparation (Ernst, 2008), others have concerns whether online pedagogy can truly prepare highly effective and qualified teachers (Columbaro & Monaghan, 2009; Bambara, Harbour, Davies, & Athey, 2009). It is fundamental

to study and apply best practices of online pedagogy in order to link the effective strategies, approaches, and techniques in special education programs that are offered through distance learning.

The second reason for studying online education for special education teacher preparation is that training and preparing special education teachers online requires that you not only consider online pedagogy but that you also consider models that will translate special education instruction into field practice. For example, interest in the preparation of special education teachers has always been at the forefront of conversations within the field. Kennedy, Alves, and Rodgers (2015) reported that teacher preparation programs face a dilemma with trying to offer coursework and experiences necessary for special education teachers to be effective in their approach in applying pedagogical content knowledge (p. 2). Training for special education teachers, particularly preservice teachers, must include multifaceted exposures for developing knowledge, skills, and dispositions in order for these teachers to be successful (Brownell, et al., 2014). In other words, preparation programs in special education must consider more than the traditional in-class training in order to positively prepare and influence special education teachers. Additionally, Kennedy, Alves, and Rodgers' (2015) study on special education preparation discusses the significance of focusing on knowledge, pedagogy, and innovations in teacher preparation programs. The authors go on to present recommendations for ways teacher preparation faculty should consider planning and delivering instruction:

1. Interteaching (the use of paired discussions and guides to improve engagement within the course)
2. Video-based reflection (video-based opportunities for reflection)
3. Content acquisition (access to multimedia based instructional materials) (Kennedy, Alves, and Rodgers, 2015)

Their pedagogical recommendations are applicable for both face-to-face and online courses in special education preparation programs. Therefore, in our project on distance education for special education teacher preparation, it is appropriate that we consider these recommendations, particularly if

we plan to provide strategies to positively impact preparation.

PROJECT REVIEW

While there continues to be a rise in universities offering online courses there is inadequate research and support for creating appropriate learning environments to prepare teachers of specialized content areas (Oncu & Cakir, 2011). One of the primary components of teaching and learning in distance education is the ability to create learning environments that are engaging and motivating, and that provide access to contributors who share similar learning objectives (Salmon, 2002). Creating an online learning environment or a course that is designed to consider the nuances of special education pedagogy is an opportunity to positively influence special education teachers as they prepare for distance education programs. As more and more universities choose to convert traditional face-to-face programs to online programs (Newberry & Logofatu, 2008), there is little doubt that it is necessary to focus on designing an online course model or template that would effectively represent specialized learning topics. Standardized online course structures (e.g., navigational layout, arrangement of materials and information, and communication tools) help reduce students' and faculty learning curve and increases efficiency of students' online learning experience (Lee, Dickerson, & Winslow, 2012). With a specialized online course design, special education teacher preparation can be positively impacted (Scott, Temple, Marshall, 2015).

This is where the idea of creating an online course design in our special education program started. In researching and reviewing course designs for converting our graduate-level special education face-to-face program to online, we determined that there was minimal support for the design and delivery of courses for special education students enrolled in distance education teacher preparation programs. As a result, we designed an online course that we believe incorporated special education and online pedagogy and utilized an important set of guidelines that allows all students to access learning based on their needs and interests (CAST, 2008). Our findings, after we designed and delivered the course to a group of graduate-level online special education students, revealed that the design and delivery yielded positive results towards

their engagement and preparation during and after taking the course (Scott, Temple, Marshall, 2015). As a result, this current project was developed to present ideas for consideration when designing online courses and particularly special education courses. The goal of this project is to highlight the model we developed for designing an online course within a graduate-level special education distance education program.

Emphasis on Content and Pedagogy

When we first began to design the online course, we needed to figure out what exactly we wanted to teach. We chose not to simply transfer content from the face-to-face syllabus to the online format. Previous failures showed us that online special education courses required a stronger sense of pedagogy and a more concentrated effort to plan design and deliver. In this case, it is necessary to consider the content and pedagogy associated with the special education content. This led us to carefully analyze the special education teacher preparation guidelines for the Council for Exceptional Children (CEC).

The CEC is the largest professional organization dedicated to improving the educational success of individuals with disabilities (Council for Exceptional Children, 2015). One of the key missions of the CEC is to develop standards and provide necessary resources for professionals to successfully become special education teachers. The preparation of special education teachers is broken down into four key areas: pedagogy, liberal arts, core academic subject matter content, and induction and mentoring. Of particular relevance for this project is the pedagogical content. According to the CEC:

...pedagogy or teaching skill has been at the heart of special education. From its roots, special education teachers have placed individualized learning needs at the center of special education instruction. Whether helping individuals with exceptional learning needs master addition, cooking, independent living, or philosophy, the field of special education has focused on altering instructional variables to optimize learning (Council for Exceptional Children, 2016, p. 6).

The CEC refined and developed the curriculum by which professional standards are taught in the special education field. There are seven specific standards between four areas of focus:

4. Learner and Learning (learner development and individual learning differences, learning environments)
5. Content Knowledge and Professional Foundations (curricular content knowledge).
6. Instructional Pedagogy (assessment, instructional planning, and strategies).
7. Professionalism and Collaboration (professional learning, ethical practice, and collaboration).

The intention of these foci is to capture the professional knowledge base of special education teachers. Under the Learner and Learning set, special education teachers learn: (a) the characteristics between and among people with and without disabilities; (b) to understand how traditions and cultures can influence a learner; and (c) to modify appropriate learning environments for learners to interact in and with the educational process. The second set involves special education teachers: (a) teaching or coteaching general curriculum content to individuals with disabilities; and (b) designing appropriate learning environments and performance accommodations for individuals with disabilities to individualize meaningful and challenging learning experiences.

Assessment is utilized, like in general education, to regularly monitor the learning progress of individuals with disabilities in both general and specialized content, and instructional adjustments are then based on these data. Special education teachers also use assessment information to support a wide variety of decisions within special education; special education teachers learn the legal policies and ethical principles of measurement and assessment related to special education referral, eligibility, program planning, individualized instruction, learning, and placement for individuals with disabilities. Additionally, individualized decision making and individualized instruction are at the center of special education practice. Therefore, the selection, development, and adaptation of learning experiences for individuals with disabilities involves considering an individual's abilities, interests, learning environments, and cultural and linguistic factors (Council for Exceptional Children, 2012).

Special education teachers also perform

multiple roles across complex situations that require an understanding of professional, legal, and ethical issues. The Ethical Principles and Professional Practice Standards of the CEC guide all special education teachers. Finally, one of the significant changes in education over the past several decades is the rapid growth of collaborative teams to address the educational needs of students. Special education teachers collaborate to create learning environments that meaningfully include individuals with disabilities, and actively engage all learners. Therefore, special education teachers utilize collaboration to facilitate individualized instruction, planning, and transitions of individuals with disabilities (Council for Exceptional Children, 2012).

Considerations in Online Pedagogy

With technologies being developed and implanted into the classroom more so now than ever before, distance and online education has become a common and valid means of acquiring, developing, and teaching special education skills and methods. Enrolment in online courses at the postsecondary level has grown at a rapid pace over the past decade, with 1.6 million students in 2002 expanding into roughly 6.1 million students participating in at least one online course in 2010 (Allen & Seaman, 2004; 2011; 2014). That said, pedagogy is still seen as guiding the learner to learn. The emphasis is still on pedagogy leading the use of technology rather than adapting to what technology offers (Laurillard, 2013). Some would state that current pedagogy could be taught with digital enhancements, but there is a growing movement within the education community stating that teacher education pedagogy has been altered by the use and development of 21st century tools and skills (Archambault, Wetzel, Foulger, & Williams, 2010; Beetham & Sharpe, 2013). Siemens (2007) is also critical of how institutions of higher learning operate, saying that they "...need to change (how they teach) because of the increasing complexity of society and globalization" (p. 1).

Green, Facer, Rudd, Dillon, and Humphreys (2005) break down online pedagogy into four key areas pivotal to individualized learning through digital technologies: 1) ensuring that learners are capable of making informed educational decisions; 2) diversifying and recognizing different forms of skills and knowledge; 3) creating diverse learning

environments; and 4) including learner-focused forms of feedback and assessment. Online pedagogy creates a slight shift in the role of the teacher (p. 9). The teacher is no longer the all-knowing informant but instead focuses on structuring, juxtaposing, interpreting, and reflecting on experiences (Kern, Ware, & Warschauer, 2004). This is expanded upon by McLoughlin and Lee (2008) who state that the utilization of Web 2.0 tools (such as blogs, wikis, media-sharing applications, and social networking sites) has changed how we define online pedagogy. According to them, online pedagogy, named Pedagogy 2.0, is broken into seven components: content, curriculum, communication, process, resources, scaffolds, and learning tasks (McLoughlin & Lee, 2008). Content is broken into microunits that enhance thinking and cognition by offering diverse perspectives to learners and utilize learner-generated resources that accrue from students creating, sharing, and collaborating together. In the curriculum, the syllabus is dynamic, open to alteration based on learner input, and consisting of smaller modules that blend formal and informal interdisciplinary learning. Communication is open between peers and the instructor and utilizes multiple forms of media to achieve clarity (McLoughlin & Lee, 2008). The process involves reflective, integrated thinking processes that are iterative, dynamic, performance, and inquiry based. Multiple formal and informal resources are used via multiple media and are globally accessible. Scaffolds are set up that support students, forming a network between peers and teachers that bonds a community. Finally, learning tasks are authentic, personalized, learner-driven and -designed tasks that enable learners to create content (McLoughlin & Lee, 2008).

The UDL Factor

From this, we can start making connections between special education pedagogy and online pedagogy. There is overlap between content, assessment, and communication. The CEC's third standard is curricular content knowledge, including modifying general and specialized curricula to make them accessible to individuals with disabilities (Council for Exceptional Children, 2015). Likewise, Pedagogy 2.0 states that offering content with diverse perspectives and representations to learners is essential for students (McLoughlin & Lee, 2008). Web-based assessments should be learner-driven

and experiential tasks (McLoughlin & Lee, 2008); the CEC states that assessments should engage learners to work toward quality learning and performance (Council for Exceptional Children, 2015). The CEC emphasizes the importance of communication and collaboration throughout its standards, and Pedagogy 2.0 states that open, peer-to-peer communication is essential to achieve both relevance and clarity (Council for Exceptional Children, 2015; McLoughlin & Lee, 2008). Utilizing the proper framework that best blends these pedagogies in an online special education course is essential for student success. Universal Design for Learning (UDL) is that framework.

UDL is an important set of guidelines that allow students to access learning, based on their needs and interests (CAST, 2008). UDL is based on research in neuroscience, specifically the three main neural networks that are involved in the learning process: 1) recognition networks (fact gathering and categorizing what we see, hear, and read); 2) strategic networks (organizing and expressing our ideas); 3) affective networks (connecting the learning experience to an emotional background, determining engagement, and motivation) (Rose & Meyer, 2002; Edyburn, 2009). To address student needs, three principles were created: 1) provide multiple means of representation; 2) provide

multiple means of action and expression; and 3) provide multiple means of engagement (Rose & Meyer, 2002; Edyburn, 2009). These principles are further broken down into nine essential guidelines: perception, language and expressions, comprehension (representation), physical action, communication and expression, executive functioning (action and expression), recruiting interest, sustaining effort and persistence, and self-regulation (engagement) (National Center for UDL, 2013). The main goal behind UDL is to help educators address the differences for all students, from those with learning disabilities to those with significant academic proficiencies (Mangiatoridi & Serenelli, 2013).

UDL is defined as a scientifically valid framework for guiding educational practice that provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged. It also reduces barriers in instruction, provides appropriate accommodations, and supports, challenges, and maintains high achievement expectations for all students (National Center for UDL, 2013). The following figure illustrates the interactions between special education pedagogy, online pedagogy, and how UDL facilitates the connections between these pedagogies.

Figure 1. Pedagogy-UDL Interconnectivity

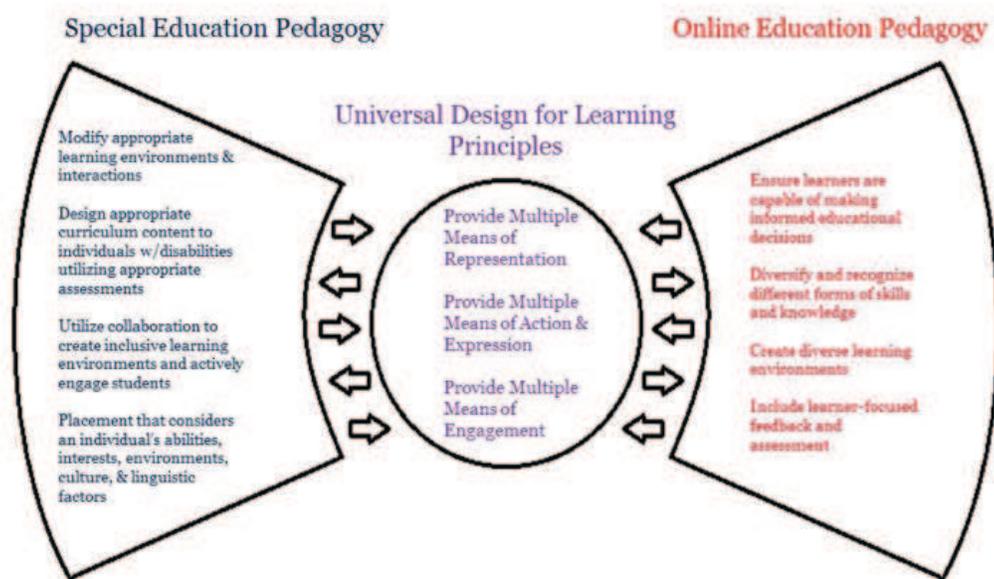


Figure 1: Adapted from *CEC Initial Level Special Educator Preparation Standards*, by the Council for Exceptional Children, 2012; *Personalisation and Digital Technologies*, by H. Green, K. Facer, T. Rudd, P. Dillon, and P. Humphreys, 2006, Bristol: Futurelab; and *Universal Design for Learning Guidelines Version 1.0*, by the Center for Applied Special Technology, 2008.

UDL is a framework that incorporates the strengths of both special education and online pedagogies. The emphasis on learner development from special education and online pedagogy is essential to UDL. Content knowledge is a key overlap between the two pedagogies, and we discovered that UDL is the means to deliver that content in accessible ways to a spectrum of learners. Collaboration and networking are important features of both pedagogies, and UDL utilizes collaboration as a means of engaging student learning. The pedagogies already featured overlapping content; UDL is the tool that cements their union. UDL provides students with the best possible educational experience and meets the high professional and educational standards set by special education and online pedagogies.

Online Course Design

It was essential that we create our online learning environments utilizing the standards set forth by special education and online pedagogies and using UDL as a guide. We designed our class to be broken down into microunits throughout the semester. Communication is a key guideline in UDL; therefore, we wanted to design our site so that communication was a constant feature. For example, peers express themselves and interact with the professors utilizing the discussion sections every week. An announcements page is implemented to keep students informed of any new information, including changes in the course and up-to-the-minute news items. This scaffold of peers, professors, and experts not only support effective delivery in the online community, but it allows for peer-to-peer collaboration. Providing

comprehensible resources for the students, specific for each week and overarching for the whole course, and utilizing multiple modalities is essential to student learning and included in the learning environment.

We chose to design our courses with the Google Apps Platform (GAP), a subunit of the Google Apps for Education service (Google, 2016). The GAP allows users to create, share, and collaborate on content produced by faculty and other students. As the online program progressed, the GAP became even more favorable as Google added additional features and supports used by students and faculty in the program. For example, one of the benefits of Google's program is the ease of data acquisition and management for professors (by way of Google Forms and Google Sheets). Utilizing the GAP we designed each classroom to begin with the home page that features a brief introduction to the course itself. From there, each course is divided into multiple sections: About the Instructor, Announcements, Course Goals and Objectives, Course Calendar, External Links and Resources, Grading Expectations/Evaluation & Assessment, Policies & Procedures, Resources, Technical Assistance, Weeks 1–12 (varying in length depending on the course), and the Sitemap. Each week is broken down into several subpages, which include: Resources, Lectures, Discussions, Assignment/Test/Quiz. Each section is accessible from every other page via a link. Figure 2 and Table 1 provide visual examples and details of the contents of each section.

Figure 2 Course Navigation Screenshot

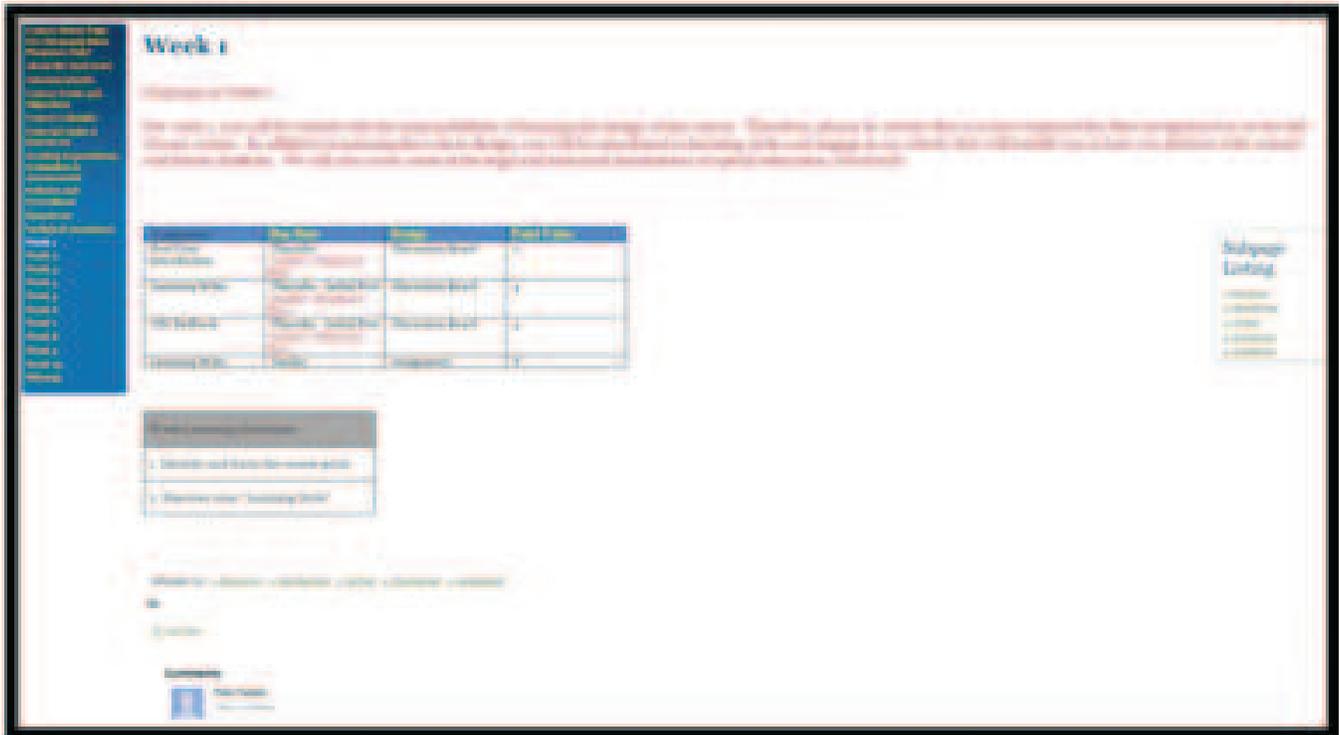


Table 1 *Online Course Sections & Content Delivery Methods*

<i>Course Section</i>	<i>Content</i>
About the Instructor	The section introduces the instructor. This can include a brief biography, and also the contact information and office hours.
Announcements	This section provides up-to-the-minute updates regarding the course. Announcements are also emailed to all the students when the page updates.
Course Goals & Objectives	Lists not only the CEC standards, but the goals that each student are expected to meet throughout the semester.
Course Calendar	A week-by-week breakdown of the assignments, their due dates, and point values for the entire course.
External Links & Resources	Links for the online gradebook, email, file drop, cloud storage, and webliography.
Grading Expectations, Evaluation & Assessment	Detailed overviews of each assignment, how each are graded, and how the point values are distributed through the course.
Policies & Procedures	Policies and procedures as mandated by the university.
Resources	A listing of required texts, required articles, suggested texts, and suggested articles, with links and downloads when applicable.
Technical Assistance	Information regarding getting help form the staff technician regarding the online course. Also includes minimum system requirements to run the website.
Weeks 1-12	Where the lectures, discussions, and weekly learning outcomes are housed. Microunits vary in length depending on whether a 10-week or 12-week course.
Sitemap	Listing of all the above components of the course for ease of access.

Online Course Implementation

Since UDL was an integral component of our online coursework design, it was important that we ensured its use throughout the entire course. We developed the following table that not only lists each of the principles and guidelines of UDL but provides examples of how each is delivered in our online courses.

Table 1 Online Course Design with UDL

<p>I. Provide Multiple Means of Representation</p>	<p>1. Provide Options for Perception</p> <ul style="list-style-type: none"> Options that customize the display of information Options that provide alternatives for auditory and visual information <p><i>Example:</i> Video/audio and slide presentations that the professor shows and that the students develop include transcripts for diverse learners and reinforce UDL concepts</p>	<p>2. Provide Options for Language & Symbols</p> <ul style="list-style-type: none"> Options that define the vocabulary and symbols Options that illustrate key concepts non-linguistically <p><i>Example:</i> To introduce students to new technologies over the course of the semester, every assignment can be completed using a different type of tool (ex. virtual avatars, vlogs, audio recordings) to narrate & explain graphical concepts</p>	<p>3. Provide Options for Comprehension</p> <ul style="list-style-type: none"> Options that highlight critical features, ideas, and relationships Options that support memory and transfer <p><i>Example:</i> Instructors highlight key elements using text, graphics, and diagrams, while providing a brief checklist of core concepts on the side of the website via navigation bar</p>
<p>II. Provide Multiple Means of Action & Expression</p>	<p>4. Provide Options for Physical Action</p> <ul style="list-style-type: none"> Options for accessing tools & assistive technologies Options in the means of navigation Options in the mode of physical responses <p><i>Example:</i> Courses utilize Google Sites as a framework by which we provide information and literature that is accessible via multiple technological and physical mediums (assigned textbooks, PDF files, and websites that can be accessed via traditional and technological means)</p>	<p>5. Provide Options for Expressive Skills & Fluency</p> <ul style="list-style-type: none"> Options in media for communication Options in tools for composition & problem solving Options in the scaffolds for practice & performance <p><i>Example:</i> Discussion assignments task students with the opportunity to choose what kind of presentation (Powerpoint, Voki, oral report, etc.) to demonstrate mastery of materials, share it within the discussion boards, and challenge other students with questions they have developed based on their understanding of the material</p>	<p>6. Provide Options for Executive Functions</p> <ul style="list-style-type: none"> Options that guide goal-setting Options that support planning & strategy development Options that enhance capacity for monitoring progress <p><i>Example:</i> In addition to the discussion boards, additional boards are set up for in-class groups to engage in discussions with each other regarding assignments, as well as a space for the entire class to get feedback from the professor and teaching assistant(s)</p>
<p>III. Provide Multiple Means of Engagement</p>	<p>7. Provide Options for Recruiting Interest</p> <ul style="list-style-type: none"> Options that increase individual choice, & autonomy Options that enhance relevance, value, & authenticity <p><i>Example:</i> Students will write a case position paper regarding a court case on a topic (ex. LRE, evaluation, eligibility) that describes the facts, issues, and findings of the order; students themselves get to choose both the topic and a case that interests them</p>	<p>8. Provide Options for Sustaining Effort & Persistence</p> <ul style="list-style-type: none"> Options that vary levels of challenge & support Options that foster collaboration & communication <p><i>Example:</i> Working together in groups of 2-3, students will develop a team teaching lesson plan for a grade 6-12 class utilizing UDL techniques. Students will also collaborate to create a brief visual presentation that also meet UDL standards</p>	<p>9. Provide Options for Self-Regulation</p> <ul style="list-style-type: none"> Options to guide personal goal-setting & expectations Options that develop self-assessment & reflections <p><i>Example:</i> Each site has a section devoted to grading expectations, evaluation, & assessment, where students can see the point values and determine the expectations of the course. Students are also encouraged to reflect on the materials via weekly discussions</p>

Adapted from CAST (2011). Universal Design for Learning Guidelines version 2.0. Wakefield, MA: Author

Starting with Provide Multiple Means of Representation, lectures are the key means of delivering information to students and video and audio were our primary means of delivering them. This is enhanced by also including transcripts for nonvisual learners and incorporating exercises within the lecture. We also introduce students to new types of technologies that they can use in their own classrooms. This begins on the first day, where we have an introduction spoken by a virtual avatar using Voki (Oddcast Incorporated, 2016). We have included a list of core concepts on the sidebar of every weekly page that gives students a way to stay focused on targeted lesson concepts, and these lesson targets are reinforced on the main page of every weekly lesson. Provide Multiple Means of Action and Expression is the next row of UDL guidelines. Physical action may seem counterintuitive to an online environment, but even providing PDFs of articles, transcripts, and assigning textbooks allows students to encounter the material digitally, listen to it by e-reader, or make print copies. Being able to express and show fluency in the material is essential to the learning experience. As stated before, we introduce students to the types of technologies that they could use in their classrooms. We also encourage students to utilize at least one new form of technology per assignment to show their mastery of the material and the medium. We wanted to ensure that a student's executive cognitive needs are being met, and that is why we include safe spaces for the students to discuss with each other and the professors the concepts within the material.

Provide Multiple Means of Engagement is the final principle in UDL. Maintaining a learner's interest is integral to the learning process, because if students are not engaged, they will not begin to interpret or learn the information. We provide assignments that give students options in how they engage the material, such as allowing them to present on the findings of a court case of their own choosing that relates to special education reform. We also provide options that allow students to learn collaborative skills and maintain a challenge. We have students work together in small groups within and outside of the course to create a professional lesson plan for hypothetical or existing classrooms of students that they may teach. This grants them an opportunity to learn the collaborative skills that

they will need to develop to be successful. Finally, providing options for self-regulation is critical to developing an engaged learner. We explicitly outline the grading expectations for the course as a whole within the syllabus, and we reinforce these expectations within the weekly lessons by providing a list of that week's learning goals.

DISCUSSION

Implications for Future Research

The overarching goal for this project was to present ideas to consider when designing online courses for special education teachers in distance education programs. The goal was to highlight a model for designing an online course within a special education teacher distance education program. In doing so, the authors sought to gather details about special education and online pedagogy that would be relevant for both instruction and design. As we indicated in our examination of the research and showcased in our model, UDL may offer ways to enhance the design and delivery of an online course. As more and more universities choose to deliver distance education courses, there are multiple factors that need to be considered when designing online courses and programs. The UDL framework in a distance education course for special education teachers offers that specialized design that can positively impact learning and preparation (Scott, Temple, & Marshall, 2015). But while the design of the UDL course in special education is promising, additional exploration is necessary to gather more facts about the learning management systems' ability (e.g., Google, WordPress, Blackboard, etc.) to interface with technologies that would heighten the infusion of UDL principles (Alphabet Incorporated, 2016; Automattic Incorporated, 2016; Blackboard Incorporated, 2016).

Furthermore, while the project shows promise for a special education course, we would like to have more details on the long-term impacts the design can have on a teacher's overall preparation. Future directions for such projects may address some of the following questions: How are general education teachers impacted by the design and delivery of an online course with UDL? While this study utilized the Google Applications Platform (GAP), are there other online platforms where UDL can be infused? Future investigations of this topic should also consider collecting information from a

range of different stakeholders about engagement in a UDL-designed and -delivered online course. With the UDL framework having multiple principles and guidelines, do they all have to be designed and delivered within one online course to maximize teacher preparation or can an instructor focus on one or two principles? Are there ways to approach other content pedagogy and UDL content to incorporate them into distance education courses and programs?

The design and delivery of online courses offers a large opportunity for distance education. Besides investigating the questions above, it is important that the discussion about how to best design and deliver online courses continue. The discussion is necessary and useful for distance education programs interested in positive and long-term impacts on students. For distance education programs, particularly special education programs, it is critically important that we get the online course design and delivery correct so that preparation standards are not lowered.

CONCLUSION

Implications for Future Practice

There are certain conclusions that we draw from our project. First, we are confident that a UDL framework can assist in merging the special education and online pedagogy for the design and delivery of content in a special education online course. Second, the ability to embed UDL principles was made evident in this project. Finally, we are confident that this framework will effectively prepare and bring positive changes to special education teachers seeking knowledge and application of special education training (Scott, Temple, & Marshall, 2015). As a result, we are prepared to apply the design and delivery to more courses in our special education distance education program.

We know that the list of special education and online pedagogy was not exhausted for this project. We also recognize that the UDL principles and guidelines presented in this project is extensive (see Table 2) and can be overwhelming for planning and designing. However, our goal was to provide and share this model as a starting point for faculty, postsecondary institutions that are interested in specialized online design and delivery, and other stakeholders. We also strongly believe that this design and delivery can make positive impacts

for special education teachers enrolled in distance education courses and programs. Overall, we are encouraged by the success of the course we have designed and believe that this project is worth further investigation by others.

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