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Enhancing Student Learning in the Online Instructional Environment Through the Use of Universal Design for Learning

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Abstract

As college faculty who prepare future teachers, we strive to teach our students through instruction and modeling best practices in teaching. We constantly evaluate our teaching and make adjustments to include updated knowledge about effective instruction. The evaluation and adjustments made to our courses lend themselves to action research. We take what we learn from our research and make appropriate changes to better meet the diverse needs of students. This article provides an overview of a final project that used Universal Design for Learning (UDL) for assessing student knowledge. This research focused on the principle of Multiple Means of Action and Expression and the impact the UDL final project had on student learning as well as overall perceptions of the project. Results indicate that participants enjoyed the final project and that it impacted their learning. Students reported enjoying having choice in how they demonstrated their understanding of the content.

Keywords: action research, college teaching, online learning, teacher preparation, Universal Design for Learning

Universal Design for Learning (UDL) is an evidence-based educational framework that supports the needs of all learners through the use of multiple means of engagement, representation, and action and expression. With strong evidence supporting the use of UDL in the K-12 setting (Coyne, Evans, & Karger, 2017; Josephson, Brawand, & Owiny, 2018), the authors have begun exploring the effectiveness of using the UDL framework in the university setting. The authors teach graduate online education courses at regional universities and consider themselves action researchers by nature. As lifelong learners, we are interested in increasing our knowledge of effective instruction and learning how to improve our courses each time we teach them. Lifelong learning is defined as “the process of gaining knowledge and skills

throughout your life, often to help you do your job properly” (Lifelong Learning, 2019). As educators, we want to ensure we are using the most effective methods of teaching our students; one way we can accomplish this is by action research. According to Martella et al. (2013), action research is meant to solve problems in real-life situations and it indicates that the researcher has a stake in the outcomes of the research. As educators, we learn from our research and make appropriate changes each semester to better meet the diverse needs of our students. This article provides an overview of a final project that implemented Universal Design for Learning (UDL) for assessing student knowledge of the course content. Specifically, this research focuses on the principle of Multiple Means of Action and Expression. The impact the UDL final project had on student learning and the overall perceptions of the project will be discussed.

Framing the Study

As college faculty who prepare current and future educators, we strive to teach our students through both our instruction and through modeling best practices in teaching. We are continually evaluating and making adjustments to include new knowledge about effective instruction. The first author found this to be true when she was teaching the Universal Design for Learning (UDL) framework to online graduate students. She originally had a five to seven page paper as the final project. Upon student questions and self-reflection of the UDL concept and the original project, the first author decided to make a change in order to model for students how the UDL framework can be used to assess student learning in their own classrooms.

Universal Design for Learning (UDL) has been cited as an effective way to meet the diverse learning needs for students in today’s K-12 classroom (Hall, Cohen, Vue, & Ganley, 2015; Katz, 2013; Kortering, McClannon, & Braziel, 2008; Meyer, Rose, & Gordon, 2014; Rose,

Johnston, & Vanden Boogart, 2014; Rose & Strangman, 2007). The authors believe that if the K-12 classrooms are becoming more diverse, that diversity will eventually trickle into the college classroom. The diverse student population has led to the need for university faculty to find ways to meet unique student needs. According to the most recent educational statistics regarding students in higher education, universities are seeing a steady increase in diversity. The increase in diversity can be seen in the number of students who are identified as (a) non-traditional, (b) military students, (c) English language learners (ELL), (d) first generation college students, and (e) students with disabilities (Boothe, Lohmann, Donnell, & Hall, 2018).

CAST (2019a) defines UDL as “a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn” (para. 4). The UDL framework addresses the (a) “why” of learning through multiple means of engagement, (b) “what” of learning through multiple means of representation, and (c) “how” of learning through multiple means of action and expression. Multiple means of engagement is what the student and instructor are doing to be *part or present in the class* with the goal of developing independent, lifelong learners. Multiple means of representation focuses on how faculty provide various ways for students to *acquire* the content being taught. This content can be taught directly by the faculty to the students or from student to student. Multiple means of action and expression is focused on the outcome or how students *demonstrate* they understand the content being taught. This includes classroom activities as well as both formative and summative assessment.

There are studies that demonstrate teacher candidates’ abilities to learn how to write lesson plans using the UDL principles (Owiny, Hollingshead, Barrio, & Stoneman, 2019; Courey, Tappe, Siker, LePage, 2012; Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007). In each of these studies, teacher candidates learned about the principles of UDL and how

to apply them in a lesson. Results indicated in each study that candidates can apply the principles of UDL with high levels of success. However, these studies did not evaluate the impact of learning through the implementation of UDL in their education preparation programs (EPP). Modeling is part of explicit instruction, an instructional high leverage practice (Hughes, Riccomini, & Morris, 2019), that is a prevalent concept taught in both general and special education teacher preparation programs. For instructors to “practice what they preach”, the first author decided that simply talking about UDL and not modeling how it can be used would not be as effective as actually providing an example of what UDL could look like when implemented in a K-12 classroom setting.

For this action research study, we focused on the “how” of learning through the multiple means of action and expression principle. University faculty can change the way they meet diverse needs in their courses by adjusting the ways students demonstrate their understanding. When we provide alternative ways for our students to demonstrate their knowledge, they become more strategic and goal-directed learners. For this specific action research project, the authors chose to focus on incorporating the option for expression and communication by allowing students to choose the way in which they wanted to construct or compose their knowledge of the Council for Exceptional Children (CEC) standards. CEC is an international professional association aimed at improving the lives of students with disabilities and for students who are gifted and/or talented. CEC is also responsible for providing educator preparation programs with program standards to ensure special educators are trained in the most up-to-date evidence-based practices. As special education teacher educators, we must design instruction that supports teacher candidates in meeting these CEC standards to ensure candidates are appropriately prepared for special education classrooms according to national standards. By allowing students

to choose how to demonstrate their understanding, it is the expectation of the authors that students were more actively engaged in learning and gained a better understanding of the course content while completing their final projects.

When conceptualizing this study, the authors focused on two research questions: (a) What is the impact the UDL final project has on student learning, both for college students and their current or future students and (b) What are the overall perceptions of the project? The first research question was identified due to the need for educator preparation programs to demonstrate an impact on student learning to ensure what they are teaching is effective. The second question was identified due to the authors' current interest in following the UDL framework at the post-secondary level.

This study can be considered action research because (a) it was completed with a small sample size, (b) it utilized one instructor who will use the data collected from the survey to improve the course and the final project for future courses, and (c) the authors have a stake in the results of this research. The first author incorporated help from fellow colleagues who have experience teaching online graduate courses and who do work in UDL, to assist in reflecting on the use of UDL in the college classroom. The second and third authors supported the project implementation and plan to use the results to inform their own practices.

Study Methods

This study was completed in three parts. The first part was teaching the UDL framework to a class of 37 students. This was completed using a two-week module in which students learned about UDL and how to incorporate it into their classrooms. The second phase included creating and distributing an online survey to the students enrolled in the course. The third phase, focused on the data collection and reflection of the online survey.

Phase One

To ensure the instructor is meeting the needs of her students in each course, the first author asks for student feedback throughout her courses. The feedback assists her in ensuring her students are engaged and have what they need to be successful in the class. Prior to this action research, the culminating project for the course was to have students write a five to seven page research and reflection paper on what they learned in the class and how they could use that information in their classrooms. Upon student questions about the project, students mentioning

This term we have covered several topics that include: (a) culturally responsive teaching, (b) universal design for learning, (c) self-determination, and (d) the acting-out cycle. Since one of the topics we covered this term was universal design for learning, I thought we would practice the concept for your final project. Instead of the 5-7 page paper, you will have the choice to complete any type of final project you are interested in. This could be a paper, a presentation, a video, a children's book, a song, etc.

The requirements for the project are as follows:

1. You must address the following standards and demonstrate that you know it relates to your current/future position
 - CEC 2.1** - Through collaboration with general educators and other colleagues, special educators will be able to create safe, inclusive, culturally responsive learning environments to engage individuals with exceptionalities in meaningful learning activities and social interactions.
 - CEC 2.2** – Special educators use motivational and instructional interventions to teach individuals with exceptionalities how to adapt to different environments.
 - CEC 2.3** – Special educators know how to intervene safely and appropriately with individuals with exceptionalities in crisis.
2. Your project must be creative, interesting, and demonstrate critical thinking.
3. You must complete the attached rubric with detailed information on where in your project, I can find the information located in the rubric. You will also be responsible for grading yourself on the rubric with rationale as to why you feel you deserve the points you awarded yourself. See Appendix A (next page). Turn this in to Bb with your final project.
4. Your final project needs to be turned into the class Padlet *and* Bb.
5. Review 2 fellow classmates projects in Padlet and offer constructive criticism.

Figure 1 UDL Final Project Guidelines

they would like to try a UDL project, and the first author's further reflection, it was decided that this would be the ideal opportunity to use the UDL principle of multiple means of action and expression. Thus the UDL culminating project came into existence. The assignment guidelines can be found in Figure 1.

Students were given the option to complete the project in any form they chose. The only guidelines were that they needed to address the CEC standards that were covered in the course and complete a self-evaluation rubric stating where in their project the information as covered and how they addressed those standards. A variety of projects were completed for this assignment: (a) 18 students created a presentation, mostly through PowerPoint with one completing her presentation with Prezi, and one creating hers through Glogster, (b) eight students wrote children's books, (c) three students created a brochure/pamphlet, and (d) two students wrote a research paper. Other submissions included: (a) writing and acting out a play, (b) writing a book of poems, (c) creating a Jeopardy online game, (d) creating a video in which students were utilized, (e) writing a student handbook, and (f) writing a cookbook.

Phase Two

Phase two was the creation and distribution of invitations to take the online survey. At the end of the course, the first author created an online survey (see Appendix A) to provide information regarding the project and how well it met the UDL guidelines for multiple means of action and expression, as well as seeking to obtain information on the positives and negatives of the project and why students chose to create the type of project they did. Once the survey had been developed and institutional review board (IRB) permission granted, the first author sent the online survey to the 37 students enrolled in her class. Students were given two weeks to complete the survey, with the deadline extended for an additional week to help overcome the

barrier of Spring Break falling within those first two weeks. Of the 37 students who received an invitation to participate in the online survey, the authors received 12 responses, constituting a 32% response rate. Given the fact that school districts' Spring Break varied for the students in the course and a new spring term was beginning, the authors believe the low response rate can still be valuable in determining the effectiveness of implementing the UDL principle of action and expression in the college classroom.

Phase Three

The final phase of this research project was to analyze the data and reflect, which was completed by all authors. The first nine questions of the survey were descriptive data about the survey respondents. Basic descriptive data were used to interpret this information. Questions 10-17 were open-ended questions regarding student perceptions of the project; the authors chose to hand-code the comments due to the small sample of responses. In order to analyze these data, the authors used a deductive approach and used pre-determined categories based on a review of related literature. Throughout the coding process, the authors added and update categories based on participant responses. The use of this deductive approach for qualitative data is supported by previous research (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008)

Findings

This action research project focused on two research questions. The first question addressed the impact the final project had on student learning and the second questions answered the overall perception of the project. The authors chose to focus on these two questions because as faculty in educator preparation programs, our goal is to impact student learning, both our own students and their future students. The other reason we chose to focus on these questions was

because we are interested in the ways that providing choice to our students impacts their engagement in the online environment.

The first question asked what type of final project they chose. The results show that the majority, five respondents, chose to complete a PowerPoint or Prezi presentation with one student choosing “Other” and specifying they completed a screencast with voiceover using Google slides, which the authors categorized as similar to a PowerPoint or Prezi presentation. Two respondents chose to write a five to seven page paper, while others chose to write children’s stories and poems. As noted earlier, other projects included a play, songs, and a cookbook.

To further expand on the question regarding the type of final project they completed, participants were also asked why they chose that project. All participants responded and the responses varied. The authors were able to break down the responses and sort them into three categories. Table 1 below shows the specific responses to the question.

Table 1 Why Did You Choose the Project You Did?

<p>Creativity</p> <ul style="list-style-type: none"> • Almost all classes ask for a writing paper as a final project, and I wanted to do something different. • I feel and think I am more creative in showing what I have learned in my classes with other things than writing a paper. • Writing a paper allows me to be creative with my word choice and writing structure, but it does not allow for other forms of creative expression. I would have stressed for weeks over the paper. Creating the final project was challenging, but fun. • It allowed me to be more creative. • I was able to be creative and not get bored with just writing a 5-7 page paper, I truly enjoyed how I was able to be creative and reflect on what I learned. • I have always wanted to write a children’s story. Through this project I have been able to teach not only my classmates, but also my family, colleagues, and students about culturally responsive teaching. • Allowed creativity. • I liked the idea of a video (but covered why that didn’t work above) and being creative. The PowerPoint project I did can also be used as a teacher training.
<p>Don’t enjoy writing papers</p> <ul style="list-style-type: none"> • I find writing papers in a clear and concise manner difficult.

<ul style="list-style-type: none"> • I chose to create a children’s book for my final project instead of a paper because I do not enjoy the process of writing a paper. Given the opportunity to choose how my final project was done, but with requirements that had to be completed, made me realize how often our students would probably like to have the same opportunity to show what they learned.
<p>Other</p> <ul style="list-style-type: none"> • It allowed me to share my knowledge in a manner that I felt I could show mastery of the content. • I wrote a paper to be able to include all elements.

Research Question #1: What is the impact the UDL final project has on student learning, both for college students and their current or future students?

The authors were interested in how this final project allowed students to demonstrate their understanding of the content and the impact on learning in the course. All 12 respondents were highly satisfied with how the project allowed them to demonstrate their knowledge. Nine respondents felt the final project significantly impacted their learning, two respondents stated it somewhat impacted their learning, and one student stated it did not impact their learning. The qualitative data regarding the impact on their learning can be found in Table 2.

Table 2 Impact of UDL Project for Student Learning

In this class, the professor provided us with different resources or ways to learn. I chose the one that I preferred, and I succeeded.
The action and expression strategies impacted me a lot during this course. They made me think of ways that I could change my own way of teaching.
Learning about multiple means of expression in theory, and then being given the opportunity to employ the strategies was very beneficial. I appreciated how well connected the final project was to the content of this course.
I was able to use technology that I was comfortable with instead of traditional (pen and paper). The opportunity to choose how I would deliver the information, is important in the action process of UDL as each learner is different.
I felt much more engaged, because I was making the choice how to learn.
It opened my mind up to new ideas and ways to reach my own students.
It honed I’m on a way to personalize how each category I personally use in my current job.
By bringing a better understanding of content than is traditionally done. There was flexibility to learn in ways that fit each of us personally.

As education faculty, we are also interested in whether what we teach will impact the students of our graduate students. The results of this question show that seven respondents felt it would significantly impact their future classroom instruction, and five respondents stated it would somewhat impact their future classroom instruction. Respondents were asked to specifically tell us how this project would impact their future classroom instruction. 10 of the 12 respondents answered this question. Results can be found below (see Table 3). As we analyzed the results, we found it especially interesting that the participants plan to use UDL not only with their students, but also when working with other adults within their schools.

Table 3 Impact on Education Students' K-12 Instruction

<p>Understanding of need for UDL</p> <ul style="list-style-type: none"> • I understood that some of my students might not have the best grades but not necessarily because they haven't learned but because they are not able to prove their learning in different ways. • Allowing students to do group work and collaborate ideas, finding a common goal, brings them together in their acts and allows for them to appreciate each other as individuals for their ideas.
<p>Technology tools for use in the K-12 classroom</p> <ul style="list-style-type: none"> • I discovered many interesting and engaging tools while looking for ways to create my project. I will be referencing these throughout my teaching for appropriate applications in my lessons. • I have already started utilizing the UDL process in my classroom. I have some students who like to use iPADS and others like to use computers, I give my students a choice. • It allowed me to see how I can reach my students in a variety of ways and what I can do to change my classroom environment.
<p>Use of UDL for professional collaboration in K-12 settings</p> <ul style="list-style-type: none"> • I've used it in my initial ARDs. *Author note – an ARD is a Texas term for an IEP meeting* • I will actually use it for professional development with my team.

The authors were also interested in students' understanding of the UDL framework and how it can be used in evaluating learning. Eleven of the 12 participants responded. One theme that emerged from this question was the ability for students to be able to choose their own

assignments. Responses regarding this theme included the concepts that providing choices allows teachers to embrace all the different ways students prefer to learn; in addition, providing choices to education students helped them to realize they can offer more choices in their own classrooms. Another theme that arose from this question was that the UDL final project was a good example of what they could incorporate into their classrooms. Because the lead author had the students share their projects with the course, one student commented that, “It allowed me to visually see examples of this in use.” Additional responses were focused on the project providing flexibility, accountability, and choice in their assignments, as well as allowing students to learn and provide knowledge in different ways.

Research Question #2: What are the overall perceptions of the project?

The remainder of the survey focused on perceptions related to the final project, such as the challenges they faced and what they found to be engaging about the project. Ten of the twelve survey respondents answered this question. The answers were divided into four categories, with some student responses being placed in multiple categories. The categories were (a) time, (b) creativity, (c) meeting all required elements, and (d) other. Students noted two challenges facing time: wanting to do a video and not being able to get teacher schedules to sync up, and balancing home and work life. The second category identified was creativity. Challenges associated with creativity included difficulty thinking outside the box and being able to include real-life examples in that creativity. The third category identified was the challenge with meeting all the requirements. Responses regarding these challenges included (a) lacking self-confidence that they could meet all the standards doing a project like this, (b) difficulty meeting all the elements in one type of project, (c) limiting the information to the page limit restriction, and (d) finding a way to demonstrate their knowledge in a children’s book. The final

category identified was “other”. Responses in this area included learning how to utilize their students in the video, and figuring out how to make the project cohesive.

With regards to what students found engaging about the project, all 12 participants responded and the authors identified three categories. The categories include: (a) choice, (b) ability to be creative, and (c) other. In regards to choice, one student wrote, “I loved having a choice of how to show my knowledge. I love to be creative. This project gave me a chance to write a book, and draw all of the pictures. I had a blast!”. One of the responses for creativity was that they enjoyed being able to combine the content learned throughout the course into one project. Responses that fell under “other” included (a) being able to see how they could use UDL in their classroom, (b) being able to see how other students interpreted the assignment, and (c) having complete ownership in the project. The answer regarding seeing how others interpreted the assignment refers to the part of the assignment in which they had to share their final project with the class.

The authors were also interested in the students’ overall perception of the UDL final project. All 12 participants responded and the authors separated their answers into three categories. The categories were that the project was fun, provided a good representation of knowledge, and an “other” category. Responses under the “fun” category noted that the project was fun, but also challenging, and that being able to create a children’s book was fun for them and something they could utilize as a resource in their classroom. Responses under “good representations of knowledge” included that it was an important part of class because it allowed them to tie everything they learned together, and that it was a fair and great representation of demonstrating the content learned in class. Additional responses included: they enjoyed seeing how everyone else learned, and that it was creative to allow choice in completing the project.

Discussion of Results

The survey results indicate that, overall, study participants enjoyed the UDL based final project and that it had an impact on their learning. The results of the study also found that students enjoyed having choices in how they demonstrated their understanding of the content that was learned in the class.

Research Question #1 Results

With the first research question, the authors were interested in was the impact the final project had on student learning. Impact on student learning is an essential element in educator preparation programs. Response themes regarding the impact to their own personal learning include: (a) being more engaged, (b) being able to choose projects they were more familiar with, and (c) being more flexible and open to different ideas. However, there was unanimous response that this project would have impact on their instruction in the K-12 special education classroom.

All respondents said that learning about UDL and completing a UDL based project will have an impact on their K-12 instruction. When focusing on the impact toward their future instruction, response themes included, (a) having a starting point to begin utilizing UDL in their classroom and that it is okay to start small, (b) realizing it is okay to offer choices and that this may lead to students being able to demonstrate they actually do know the content learned, and (c) taking the framework and using it in other areas of the job such as Individualized Education Program meetings and professional development opportunities.

Research Question #2 Results

The second area of research the authors focused on was the overall perceptions of the UDL final project. Descriptive data provided by respondents show that 100% of participants were highly satisfied that the final UDL project allowed them to demonstrate their understanding

of the concepts learned in the course. We also were interested in knowing what challenges were encountered and what was most engaging. The authors believe this information will aid in making adjustments to the overall project guidelines to better meet the needs of the students. When the authors looked at the difficulties, it was apparent that meeting the requirements, allowing choice, creativity, and time were the top three themes. This tells us that, when designing course assignments involving choice, the assignment guidelines must be clear and there must be flexibility in the way students complete the project. For example, we believe that, for future projects, we should allow students to submit a half page written addendum to any projects that helps to clarify their knowledge and better demonstrate their knowledge in areas they were unable to do so in their project.

When we reviewed the responses regarding the engagement of the final project, the fact that the project was fun and that it was a good representation of their knowledge were the top two themes. This is important because engagement is the first principle of UDL. The authors are pleased to see the positive responses in regards to engagement. This indicates that addressing multiple means of action and expression by offering choices in project development, allows students to meet the UDL multiple means of engagement principle. Additionally, one student mentioned that the project allowed him/her to take ownership in the project. When students take ownership in a project, they are more likely to work harder and will be more interested in the project thus resulting in improved outcomes (Patall, Cooper, Robinson, 2008). Furthermore, this demonstrated success in meeting the goal of multiple means of action and expression: to create learners who are strategic and goal-directed and overlapped into the principle of engagement guideline of recruiting interest through optimizing individual choice and autonomy (CAST, 2019b) .

Reflection

The student responses from this action research were positive in regards to how well the students enjoyed working on the project and the impact the project had on student learning. Based on the feedback provided by the students and the authors' experience in providing a final project based on this guideline, we believe that by implementing multiple means of action and expression in the online classroom, student engagement increases. In addition, the authors believe that projects such as this one support students in implementing what they learn in their coursework into their own classroom instruction.

From a student's perspective, the ability to demonstrate their knowledge in a way that aligns with their own learning preferences, makes for a more useful final project that can be used in other aspects of their teaching, such as providing professional development opportunities to other educators or implementing pieces of the UDL framework in their own classes. Additionally, comments gleaned after the course ended revealed that the students enjoyed demonstrating their knowledge this way, they were excited about the project, and that they are beginning to implement UDL in their classrooms.

As an instructor, the pressure to design the perfect project was minimized. In addition, the ability to grade multiple type of projects was energizing and allowed the instructor to begin thinking outside the box when creating future projects. This is due to the fact that students are choosing a project they are interested in or in which they excel. Students who find writing research papers difficult will choose a different mode to demonstrate their knowledge; this helps them to focus on showing their content knowledge. The difficulty that comes with grading a UDL based final project is creating an effective rubric (see Appendix B), one in which the details of the content that needs to be addressed is clearly delineated and does not allow for instructor

bias based on the student's creativity. After grading and reflecting on the projects the first author will make changes to her grading rubric. These changes will include: (a) defining words such as "exceptional understanding", (b) removing the criteria about providing details/examples, as many projects did not lend themselves to this, and (c) reversing the order of the columns so that students see the expectations first when looking at the rubric.

The goal of multiple means of action and expression is to create students who are strategic and goal-oriented by providing options for physical action, expression and communication, and executive functions. Upon completion of this action research project, the authors believe future research should focus on whether or not providing choice in assignments achieves this goal. Due to the low sample size, the authors believe additional research could include face-to-face students, undergraduate students, as well as additional courses and instructors. Adding these additional demographics will allow the authors to determine the extent to which the use of providing assignment choices is effective, to whom it is most effective, and the teaching methods associated with the projects' effectiveness. Additionally, future research could include K-12 educators to better understand the impact teacher education practices have on classroom instructional practices.

Furthermore, after reviewing the results of this study, the lead author has determined that allowing students options for completing different assignments may be a useful tool in meeting the multiple means of action and expression UDL guideline. Providing these options allows students to show their knowledge in a manner that aligns with their learning preferences. While we do not believe that students should receive choice in all assignments, the authors understand that providing choice in some projects supports student engagement and learning. Based on the results of this inquiry, the lead author will continue to assign this project and will seek to find

ways of providing choice for assignments in other courses. Likewise, this action research project has encouraged the second and third authors to offer more choice in their courses.

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Appendix A Survey Questionnaire

1. Have you taken other online graduate courses at SE?
 - a. Yes
 - b. No

2. If so, how many other online graduate courses have you taken?
 - a. 1-3
 - b. 4-7
 - c. 8-10

3. What is your current job (check all that apply)?
 - a. General Education Teacher
 - b. Special Education Teacher
 - c. Special Education Administrator
 - d. Parent of a student with a disability
 - e. Other (please specify) _____

4. What type of final project did you complete?
 - a. Research paper
 - b. Professional Development Opportunity
 - c. Informational Handouts
 - d. Children's Story/Book
 - e. PowerPoint or Prezi Presentation
 - f. Poem
 - g. Song
 - h. Other (please specify)

5. Rate your level of satisfaction for how well the final project allowed you to:
 - 1 = Highly Dissatisfied
 - 2 = Dissatisfied
 - 3 = Satisfied
 - 4 = Highly Satisfied
 - a. Interact with accessible materials and tools by varying the methods of response and navigation
 - b. Interact with accessible materials and tools by optimizing access to tools and Assistive Technology

6. Rate your level of satisfaction for how well the final project allowed you to:
 - 1 = Highly Dissatisfied
 - 2 = Dissatisfied
 - 3 = Satisfied
 - 4 = Highly Satisfied
 - a. Compose and share ideas using tools that help attain learning goals by using multiple media for communication

- b. Compose and share ideas using tools that help attain learning goals by using multiple tools for construction and composition
 - c. Compose and share ideas using tools that help attain learning goals by building fluencies with graduate levels of support for practice and performance
7. Rate your level of satisfaction for how well the final project allowed you to:
- 1 = Highly Dissatisfied
 - 2 = Dissatisfied
 - 3 = Satisfied
 - 4 = Highly Satisfied
- a. Develop and act on plans to make the most out of learning by guiding appropriate goal-setting
 - b. Develop and act on plans to make the most out of learning by supporting planning and strategy development
 - c. Develop and act on plans to make the most out of learning by facilitating the management of information and resources
 - d. Develop and act on plans to make the most out of learning by enhancing capacity for monitoring progress
8. Rate your level of satisfaction with how well the final project allowed you to demonstrate your understanding of the concepts learned in the course.
- 1 = Highly Dissatisfied
 - 2 = Dissatisfied
 - 3 = Satisfied
 - 4 = Highly Satisfied
9. To what extent did you find the self-evaluation rubric in helping you in reflecting on your learning?
- 1 = Not at all helpful
 - 2 = Somewhat helpful
 - 3 = Very helpful
10. Rate the level of impact the final project had on your learning in this course.
- 1 = Did not impact my learning
 - 2 = Somewhat impacted my learning
 - 3 = Significantly impacted my learning
11. Rate the level of impact that the use of multiple means of action and expression in your final project will have on your future classroom instruction as a K-12 Special Education Teacher.
- 1 = Will not impact my future classroom instruction
 - 2 = Will somewhat impact my future classroom instruction
 - 3 = Will significantly impact my future classroom instruction
12. What did you find challenging about the final project? (open-ended)

13. What did you find engaging about the final project? (open-ended)
14. What was your overall perception of the UDL final project used in SPED 5153? (open-ended)
15. Why did you choose the project you did and not the original 5-7 page paper that was assigned? (open-ended).
16. In what ways did this final project help you better understand the UDL framework and the use of multiple means of action & expression to evaluate student learning?
17. Specifically, how did the use of the action and expression strategies in this project impact your own learning in this course? (open-ended)
18. Specifically, how will the use of the action and expression strategies in this project impact your classroom instruction? (open-ended)
19. Any additional comments you would like to provide, please mention below. (open-ended)
20. If you would be willing to share your project with future/current higher education faculty in order to gain a better understanding of choices that students make when given a UDL final project option, please email the principal investigator at kboothe@se.edu. In your email please make sure to include your permission for your project to be shared and ensure that a pseudonym, instead of your real name, is used in your project.

Appendix B
Grading Rubric

Standard	Unacceptable	Developing	Acceptable	Proficient
CEC 2.1	Student does not demonstrate an understanding of how to create a safe, inclusive, culturally responsive learning environments to engage individuals with exceptionalities in meaningful learning activities and social interactions.	Student demonstrates a basic understanding of how to create a safe, inclusive, culturally responsive learning environments to engage individuals with exceptionalities in meaningful learning activities and social interactions, as evidenced by details/examples	Student demonstrates an understanding of how to create a safe, inclusive, culturally responsive learning environments to engage individuals with exceptionalities in meaningful learning activities and social interactions, as evidenced by details/examples in an easy to read way to understand.	Student demonstrates an exceptional understanding of how to create a safe, inclusive, culturally responsive learning environments to engage individuals with exceptionalities in meaningful learning activities and social interactions, as evidenced by clearly written details/examples in an easy to read way to understand.
CEC 2.2	Student demonstrates no understanding of how to use motivational and instructional interventions to teach individuals with exceptionalities how to adapt to different environments.	Student demonstrates an basic understanding of how to use motivational and instructional interventions to teach individuals with exceptionalities how to adapt to different environments as evidenced by limited details/examples.	Student demonstrates an understanding of how to use motivational and instructional interventions to teach individuals with exceptionalities how to adapt to different environments as evidenced by a clearly written, paper with details/examples.	Student demonstrates an exceptional understanding of how to use motivational and instructional interventions to teach individuals with exceptionalities how to adapt to different environments as evidenced by a clearly written, paper with appropriate details/examples.

CEC 2.3	Student demonstrates no understanding of how to intervene safely and appropriately with individuals with exceptionalities in crisis.	Students can partially articulate how they will intervene safely and appropriately with individuals with exceptionalities in crisis.	Students can articulate how they will intervene safely and appropriately with individuals with exceptionalities in crisis.	Students can clearly articulate how they will intervene safely and appropriately with individuals with exceptionalities in crisis. Student provides details/examples in their paper.
Critical Thinking	Overall, the project shows little to no evidence of critical thinking. Candidate provides little or no examples/details to demonstrate an understanding of the standards as evidenced in all parts of the project.	Overall, the project shows basic evidence of critical thinking. Candidate demonstrates a basic understanding of the standards as evidenced by the examples and/or details they provide as evidenced in all parts of the project.	Overall, the project shows evidence of critical thinking. Candidate provides adequate examples and/or details to demonstrate an understanding of the standards as evidenced in all parts of the project.	Overall, the project shows exceptional evidence of critical thinking and is completed in a clear and concise manner that is easy to read and understand. Candidate provides exceptional examples and/or details demonstrates an understanding of the standards as evidenced in all parts of the project.
Overall Presentation	Student did not complete the presentation and it is not creative or neatly done.	Presentation is missing required components.	Presentation is completed and contains all required components.	Presentation is well done and contains all required components. Presentation is clean and creative.