

Abstract

Today's classroom is more diverse than ever; it is imperative that universities find solutions for meeting these diverse learning needs. One potential solution is Universal Design for Learning (UDL), which is a promising practice in the K-12 classroom. UDL is a framework for teaching and learning that is based on the idea that diversity among students is predictable and systematic adjustments to the curriculum should be made based on that predictability. While there is strong research supporting the use of UDL for traditional K-12 classrooms, there is little research regarding its implementation in the online university teacher preparation classroom. This action research study explores the use of UDL for increasing student engagement in the online Special Education teacher preparation courses for one university faculty member. The authors seek to better understand the use of UDL in the university setting by examining the impact of engagement strategies in online Special Education teacher preparation courses. Results of this action research, as well as implications for the authors, are discussed.

Keywords: action research, teacher preparation, online learning, Universal Design for Learning, student engagement

Engaging Graduate Students in the Online Learning Environment: A Universal Design for Learning (UDL) Approach to Teacher Preparation

As university faculty members and former public school teachers, we are action researchers by nature. We know that good teachers are constantly learning and growing in their field through both reading the current research on Education and by conducting action research in their own classrooms. The first two authors are currently Assistant Professors of Special Education and teach primarily online teacher preparation courses. The third author works at a junior college and teaches some online courses as an adjunct professor. The final author is an Instructional Designer and primarily works in teacher preparation programs; in addition, she serves as an adjunct instructor. Each of us is passionate about teaching and learning; we are constantly seeking ways to increase our own knowledge of best practices in Education. Action research provides us with the opportunity to enhance our teaching skills in a manner that is meaningful to us.

Framing the Study

The first author teaches in a fully online Special Education masters-level teacher preparation program and the second author teaches both in-seat and online courses at both the graduate and undergraduate levels. Before beginning their current positions, they started researching online instruction and the realities of the college classroom. They knew that they needed to be prepared for the diversity that exists in today's classroom. In addition to the number of non-traditional students, students working full-time, and students who are also parents attending school, there are a large percentage of students who are either English Language Learners (ELL) or who have an identified disability. Eleven percent of college students report having a disability (U.S. Department of Education, National Center for Education Statistics,

2016a) and the ELL population is over nine percent (U.S. Department of Education, National Center for Education Statistics, 2016b). Students from each of these populations bring a variety of unique learning needs to the online classroom and university professors must be prepared to meet each of these needs.

The first two authors searched for solutions for meeting these diverse learning needs and found Universal Design for Learning (UDL), which is a promising practice in the K-12 classroom (Meyer, Rose, & Gordon, 2014). UDL is based on the idea that diversity among students is predictable and systematic adjustments to the curriculum should be made based on that predictability (Glass, Meyer, & Rose, 2013). UDL differs from traditional classroom differentiation in that learning is primarily student-directed, with options and expectations outlined by the teacher (Novak, 2014) and its use may reduce the likelihood of unintended barriers in the classroom (Doolittle Wilson, 2017). The success of UDL for K-12 classrooms and the inherent flexibility that exists within the UDL framework led the authors to further explore the possibility of its implementation in the university online classroom.

Universal Design for Learning considers student needs in three different learning networks: (a) recognition, (b) strategic, and (c) affective (Glass et al., 2013). The recognition network involves the ways in which students acquire the course content and is the experience of learning (Rose & Strangman, 2007). The strategic network includes the ways in which students demonstrate their knowledge about course content (Glass et al., 2013; Meyer & Rose, 2005; National Center on Universal Design for Learning, 2014). The affective network is related to student motivation and engagement with the course content and controls learners' emotional responses to the topic and to the learning itself (Rose & Strangman, 2007).

It is important to note that while UDL is not a checklist nor a list of strategies that must be implemented, CAST has offered a list of concrete suggestions for implementing the framework in the classroom in the 2018 update to the UDL Guidelines (CAST, 2018). When university professors utilize a UDL framework in their classrooms, they must be intentional, proactive, and reflective (CAST, 2018; Novak, 2014). When the first author chose the strategies to implement in her online courses, she considered the specific needs of the student population, as well as practical limitations, such as time and technological resources available within the university.

As we began to consider potential ways to incorporate the UDL framework into online teacher preparation courses, we chose to start small with the plan to grow our UDL skills over time. This concept is presented by UDL expert Katie Novak in her book *UDL Now* (Novak, 2014); she states in Chapter 1 that “you don’t need to change everything at once” (p 6). Instead, she recommends starting with one small change, becoming proficient and comfortable with it, and then slowly adding more until you are fully implementing the UDL framework. As a new professor with a heavy teaching load of fifteen credit hours, the first author chose to follow this advice. Previous research (Wonglorsaichon, Wongwanich, & Wiratchai, 2014) has identified that student engagement in, and motivation for, learning increases achievement. With this knowledge in mind, the authors chose to start their UDL exploration by focusing on the affective network, with the plan to address both the strategic and recognition networks in later semesters.

A variety of strategies can be used to impact the affective network and increase student motivation and engagement in an online university course (Glass et al., 2013; Meyer & Rose, 2005; National Center on Universal Design for Learning, 2014). The strategies include (a) choice in course assignments (Gradel & Edson, 2010; Tobin, 2014), (b) collaborative group

assignments (Rao, Edelen-Smith, & Wailehua, 2014; Scott, Temple, & Marshall, 2015; Smith, 2012), (c) consistency in assignment due dates and expectations (Rao et al., 2014), and (d) instructor availability via phone and office hours (Rao et al., 2014). Recent research indicates that teacher candidate motivation may be increased in the online classroom through the use of (a) Webquests (Yang, Tzuo, & Komara, 2011), (b) social networking (Habibi et al., 2018), and facilitated online discussions (Lee & Martin, 2017).

While there is strong research supporting the use of UDL for traditional K-12 classrooms, the authors found little support for its implementation and its effectiveness in building student engagement in the university teacher preparation classroom online; the authors wanted to investigate this further through action research in the online courses of the first author.

Action research in the classroom is used by teachers to systematically examine and improve their practice; the use of action research allows teachers at all levels to become active participants in determining the most effective instructional techniques or strategies in his/her own classroom (Efron & Ravid, 2013). In higher education, in particular, the use of action research has proven to be a successful method for improving both teaching and learning (Yasmeen, 2008). This particular study can best be described as action research because it was conducted on a small-scale with one professor and the aim of the investigation was to improve her own teaching practice in online courses, not to make generalizations regarding best practices in online education overall. Knowing that action research requires reflection (Efron & Ravid, 2013), the first author recruited trusted colleagues to support her in reflecting and discussing this inquiry throughout the implementation of the study. The specific strategies utilized in this study were chosen based on a review of the literature regarding best practices in online higher

education, as well as the first author's desire to more fully incorporate social media options into her teaching, through the use of Twitter and Blackboard.

Study Methods

The authors designed this action research study in three phases. Phase 1 involved the implementation of the interventions. Phase 2 was an online survey of the students who received the intervention and Phase 3 involved data analysis. Each of the three phases is outlined below.

Phase One

In preparing for this research, the authors began looking at ways that online faculty could make connections with students in a virtual environment as they believed that these connections are the key to student motivation and engagement. At the time, the first author had the highest teaching load and the largest number of unique students, so the authors decided to conduct the action research with her students first, with the plan to later implement similar strategies in the courses of the second and third authors. The first author implemented the chosen strategies in each of the following courses during the Fall 2016 semester: (a) Introduction to Special Education, (b) Understanding Autism Spectrum Disorders, and (c) Collaboration, Partnerships, and Secondary Transition in Special Education. These courses were chosen for the study because they are taught by the first author and all three courses implemented the UDL framework by utilizing the same engagement strategies. A variety of techniques were used in order to engage students with both the course content and with one another. These strategies included: (a) calling each student before the course began, (b) holding weekly online office hours, (c) professor availability by cell phone and text message, (d) weekly Twitter chats, and (e) weekly Blackboard Collaborate course sessions. Blackboard Collaborate is an online classroom tool that includes (a) video, (b) audio, (c) a chat function, and (d) the ability to share applications

with session participants (Blackboard Inc., 2017). Student participation in each of these strategies was optional and students were provided weekly reminders about upcoming Twitter chats and Blackboard Collaborate sessions. Because many of the students were unfamiliar with both Twitter and Blackboard Collaborate, basic instructions for utilizing these tools were provided for students via course announcements that were also sent via email. In addition, the first author provided 1:1 support for individual students when it was requested. At the time of the study, the first author was the only faculty member in the department utilizing this combinations of strategies, so the students involved in the action research experienced courses both with and without the use of these specific engagement strategies.

Phase Two

At the beginning of the Spring 2017 semester, the students who had taken one or more of the three chosen courses were invited to participate in an online survey to gain their feedback regarding the UDL strategies. This survey invitation was sent by the fourth author, who is an Instructional Designer at the same university as the first author. Thirty-one students received an email invitation to participate in the study and 20 responded, constituting a response rate of 65%. Given that these students have taken other online courses where UDL strategies may not have been actively utilized, these students were in the unique position of comparing a course with a UDL framework to a course without taught without intentional UDL implementation.

While no demographic data was reported by the specific study respondents and we were unable to obtain information about the specific students in these courses, demographic data of the overall university population is available. The average student is considered to be a nontraditional student, with the mean age being 37 and the median age being 35. Approximately 70% of university students are females and about 30% are males.

Phase Three

The final phase of the action research was analysis of the data from the student surveys. The online survey was hand-coded to look for themes and this coding was verified. The authors took a deductive approach to the coding of the data and began the process of data analysis using pre-determined categories. The initial coding categories were: (a) connection to classmates and professor, (b) connection to course content, (c) application of UDL in their careers, and (d) drawbacks to the use of UDL. Throughout the coding process, the authors updated and changed the codes as necessary to accommodate the data collected from the survey. In particular, the second and fourth coding categories were dropped as the data did not support the use of these categories. In addition, based on the numerous responses related to the increased connection to others in the course, the first category was divided into two separate categories: one for connection to classmates and the other for connection to professor. Finally, an additional category was added to classify the responses that indicated students' engagement in the course increased due to the use of the UDL strategies. This deductive approach to coding qualitative data has proven to be effective in previous research (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008).

Findings

Based on the student responses, the majority of the study participants were aware of the UDL strategies offered in the course, but most participants did not report engaging with the optional learning opportunities provided. Based on her experience teaching the courses, the first author agrees that this is likely the case as there were several weeks where nobody attended neither the Twitter chat nor the Collaborate session. Seventy-four percent of students were aware of the professor's online office hours, but only 21% reported attending office hours. The first

author finds this interesting as nobody actually attended her online office hours; it is surmised that students may have confused the office hours with the Collaborate sessions. Eighty-nine percent of participants reported knowing about the weekly Twitter chats, while 26% reported attending one or more of those chats. Seventy-nine percent of participants reported that they knew about the weekly Collaborate sessions and 26% reported attending one or more of those sessions. The only UDL engagement strategy that study participants reported engaging in regularly was the use of phone calls and text messages to contact the instructor. Ninety-five percent of students were aware of this option and 42% reported contacting the instructor in this manner. This data aligns with the authors' experiences as students seemed to prefer to contact the first author via text messages versus email, phone calls, or online chat sessions.

Study participants noted that the UDL engagement strategies helped them feel more connected to both the course professor and to other students in the course. Interaction with the course professor helped them feel more connected to the course, valued as a student, and supported in their learning; participant open-ended responses indicate that the UDL engagement strategies had a greater impact on student connection to the professor than connection to classmates. This finding reflects previous research that indicates online students value instructors they view as present and accessible (Deschaine & Whale, 2017). Specific responses related to the theme of connection can be found in Table 1. As outlined in the table, the specific, targeted focus on increasing student engagement led to students feeling that: (a) there was an open line of communication with the professor, (b) the professor wanted to know each student as a person, (c) they got to know other students, (d) they were accountable to others to do their best in the course, and (e) they were not alone in their learning.

Table 1 *Student Responses Related to Connection to Professor and Classmates*

Connection to Course Professor	Connection to Classmates	Impact of Connection on Course Engagement
It definitely felt more personable and human just to hear the instructor's voice.	I like the collaboration sessions, I tried to always make the sessions. They were helpful to hear from other students and the instructor.	Because of the human connection I felt valued and wanted to do my best in the course.
I thought [the phone call] was very thoughtful. This is the only instructor that has called me before class started.	[Collaborate] made it feel more connected to classmates.	I was more likely to engage in course content when Twitter and blackboard collaborate were involved.
It was also nice to see [the professor's] children on occasion.	I loved that I had the ability to visually connect with my instructor and classmates via Collaborate.	It held me accountable throughout my courses.
[The initial phone call let me] Know that the instructor wanted to talk to get to know you, and let you know that if you need help that the instructor is there to help you through this course.	I enjoyed being able to connect with my classmates and the professor via social media	It was a great resource to have. Compared to other courses at other universities where I felt that I was in it by myself.
It was nice to hear from my professor even if it is on a voicemail. It's nice to have an open line of communication.	The Collaborate sessions provided me with a true opportunity to connect with the course content, my instructor, and my classmates.	
[When I received the initial phone call, I was] surprised at first, then relieved to know that there was [a] professor invested in the course and in me as a student.		
[Blackboard Collaborate] provided that connection between student and teacher that is often lacking in online courses.		
[initial phone call was] Kind of shocking - showed that she cared and wanted to create a connection with me		
I felt like the instructor was very professional in calling and		

I felt like I was not just a name on a screen, but that she cared for my success and at making a connection with her students. I found this to be a very positive step.		
I thought it was nice that the instructors went out of their way to greet us to their class. Nice and welcoming.		

Students reported appreciation for the professor’s availability via a variety of methods, including (a) office hours, (b) phone, (c) text, (d) email, (e) Twitter, and (f) Blackboard Collaborate. As noted earlier, students communicated with the instructor most often through the use of phone calls and/or text message. Specific survey responses related to the theme of instructor availability are found in Table 2. These responses noted that they (a) appreciated being able to contact the professor during a family crisis, (b) were more comfortable contacting the professor and asking questions, even in courses taught by other professors (c) liked the variety of options for communication with the professor, and (d) felt that the instructor’s availability demonstrated commitment to students.

Table 2 *Student Responses Related to Instructor Availability*

Really grateful to be able to contact [Professor], especially when I was dealing with a family crisis.
It is nice to know I can directly contact a professor rather than wait for an email response.
I did not know about her office hours, because she was usually available by other means.
I found that her availability made me feel comfortable to ask any questions that I may have. She always responded promptly, even when maybe she should not have, like during Christmas and Thanksgiving breaks.
It was good to know that the professor was there and available if needed.
I really appreciate the phone call at the beginning and the access to communication with the professor.
I had an awesome instructor that was easy to communicate with.
I enjoyed [Professor] and her communication. She was the only instructor that actually called me.
It was generous of the professor to offer online office hours.

It made me feel that my education and understanding of class expectations/assignments was important to the professor.
The instructor was very accessible and communicated quickly. This helped to reduce stress. There were times I even contacted the instructor while taking a different class because I knew she was willing to help and was quick to respond.
[Professor's availability was] Excellent and different from other professors I have had.
I know that if I have a question, my professor does not mind if I call or email. This is nice. I don't want a lot of interaction to be compulsory or expected, but I do want to know my professor can answer specific questions that come up.
It was easier to get a hold of them because most everyone is on their phone and texting is pretty quick for answers.
I like that she is available by phone if I need her.
I like how available she is.
I appreciated knowing that she was available by phone or text if I needed her
The instructor was very approachable, helpful and sufficiently answered my questions
I appreciate that the teacher was available for consult and feedback, even above and beyond office hours.

In addition to enhancing their learning in their current courses, the authors hoped that the inclusion of the UDL engagement strategies would influence the teaching strategies used by the teacher candidates in their own classrooms. When asked to describe how the UDL engagement strategies would impact their future teaching careers, students indicated that the UDL strategies utilized in the university courses will have a positive impact on their own future teaching practices. Participant responses related to this theme can be found in Table 3. Specifically, students noted that they would use similar techniques to communicate with both students and families and that doing so will demonstrate both their commitment to student learning and to family engagement in the classroom. The responses to this particular question aligned with our expectations for this action research. When we embarked on this project, we hoped to both increase student engagement in learning, as well as model teaching practices that pre-service teachers can later utilize in their own classrooms.

Table 3 *Student Responses Related to the Impact on Future Teaching*

I think I can use similar strategies to connect with families of my students to increase engagement into my new center program.
I appreciate the different means of communication and collaboration offered in the courses. They are good resources to use when I am looking for a varied way to communicate with families and students.
I feel that she is the kind of instructor that I want to be, getting my students involved at any level possible.
I can see where it would increase relations between parents/guardians and staff. I need to make sure my students know that they can talk to me about assignments at any time.
I will establish an open line of communication with the parents of my students.
The connection and relational aspect of the engagement strategies was effective and serves as an example of how relationships can be Strengthened even with minimal physical contact.
When I am a SPED teacher, I will contact the parents of my students on a weekly basis and provide families increased availability to me via text and email.
Make myself more available through technology to my students and their families
I will reach out to my parents through many mediums, such as phone calls, online office hours, and collaboration.
Her commitment to her students is exceptional and I would like to show my commitment to my students similarly.
Seeing a professor take those extra steps to connect with students sets a great example for how possible it is for us to go above and beyond for our students.

Discussion of Results

Study participants noted that the UDL engagement strategies helped them feel more connected to both the course professor and to other students in the course. A common theme in the participant responses was that the interaction with the course professor helped them feel more connected to the course, valued as a student, and supported in their learning; participants responded that the UDL engagement strategies increased their feeling of connection with the professor more than it impacted their connectedness to classmates. These responses support both the expectations of the authors and previous research indicating that building relationships between students and teachers is a key component of effective instruction and that students want to be known as individuals by the course instructor (Faranda & Clark, 2004; Kelly & Zhang, 2016; Stage & Galanti, 2017). Rodriguez-Keyes, Scheneider, & Keenan (2013) noted that

students report higher levels on engagement in courses where the instructor builds a connection with students and student learning is enhanced through these relationships (Hamre & Pianta, 2001; Rimm-Kaufman & Sandilos, n.d.).

Another theme that emerged through the open-ended questions was that students appreciated the professor's availability via a variety of methods, including (a) office hours, (b) phone, (c) text, (d) email, (e) Twitter, and (f) Blackboard Collaborate. In particular, students appreciated the fact that they could use a variety of methods to contact the instructor and that the course instructor was available outside of traditional working hours. Of all communication methods offered, students most frequently utilized phone calls and/or text messages. The authors believe these forms of communication felt more direct and personal, and were more convenient for busy students, than were the other methods of communication available.

The third theme that emerged was that students believe that the UDL strategies utilized in these courses will have a positive impact on their own future teaching practices. This theme was in direct response to a survey question asking study participants to describe how the UDL engagement strategies would impact their future teaching careers. In particular, students reported that they will use a variety of communication tools when working with the families of their students and will utilize technology to enhance communication and instruction for their students. As teacher educators, the authors were hopeful that this would be the result as we want every strategy used in our classroom to ultimately result in our students becoming better teachers.

Reflection

This action research project provided the authors with a better understanding of meeting student needs in the virtual classroom. Based on the feedback from the students in the survey and the first author's experiences with each of the chosen UDL engagement strategies, we

believe that the use of a UDL framework is a valid method for increasing student motivation, and hopefully student learning, in online teacher preparation courses. The results from the study led the first author to continue using, and refining, each of these strategies for use in her courses, the second author to begin including optional online meetings in her own online courses, and the third and fourth authors to use some of the strategies in their adjunct courses. During the next four semesters, the first author continued using each of the strategies initially examined and also created a Blackboard community for all the masters in Special Education students at her university. The Blackboard community was created based on the results of this action research that led the first author to understand students' desires for connection. Within that community, the first author hosts quarterly roundtable lectures on topics of interest to the students, provides archives of the Twitter chats, and posts information relevant to all students, such as job postings, current research, and conference information. The community also provides students a means to connect with one another via optional discussions.

In addition to the increased understanding of supporting students, we are also left with many more questions about online instruction and several more action research projects to conduct. Specifically, the authors want to explore: (a) how to build teacher-student relationships in the online university classroom, (b) the impact of a UDL framework on student success in the course as evidenced by grades, participation, and retention and attrition, (c) the impact of online engagement strategies for enhancing learning in traditional face-to-face courses that also use an online learning management system, and (d) the long-term impact of the use of UDL engagement strategies in teacher preparation courses on teacher performance in the classroom. We are especially interested in the final area as we strive to fully prepare our students for becoming effective classroom teachers.

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Appendix A: Survey Questionnaire

1. Did you take any of the following courses at CCU during the fall of 2016 (check all that apply)? For the rest of the survey, please answer the questions as they pertain to these particular courses.
 - a. SED 500
 - b. SED 502
 - c. SED 512

2. Have you taken other online courses at CCU?
 - a. Yes
 - b. No

3. If yes, how many?
 - a. 1-2
 - b. 3-5
 - c. 6+

4. Have you taken online courses at another university?
 - a. 1-2
 - b. 3-5
 - c. 6+

5. Were you aware that the instructor called students before the start of the course?
 - a. Yes
 - b. No

6. To what extent did the initial phone call from the instructor increase your engagement in the course? (1=did not increase engagement; 5=significantly increased engagement)

1 2 3 4 5

7. What was your perception of the initial phone call from the instructor? (open-ended response)

8. Were you aware that the instructor held online office hours during the course?

a. Yes

b. No

9. Did you attend any of the instructor's online office hours?

a. Yes

b. No

10. To what extent did the instructor's online office hours increase your engagement in the course? (1=did not increase engagement; 5=significantly increased engagement)

1 2 3 4 5

11. What was your perception of the online office hours? (open-ended response)

12. Were you aware that the instructor was available via phone and text message during the course?

a. Yes

b. No

13. Did you communicate with the instructor via phone or text message during the course?

a. Yes

b. No

14. To what extent did the instructor's availability via phone and text message increase your engagement in the course? (1=did not increase engagement; 5=significantly increased engagement)

1 2 3 4 5

15. What was your perception of the instructor's availability via phone and text message?
(open-ended response)

16. Were you aware that the instructor held weekly Twitter chats during the course?

- a. Yes
- b. No

17. Did you attend any of the Twitter chats?

- a. Yes
- b. No

18. To what extent did the Twitter chats increase your engagement in the course? (1=did not increase engagement; 5=significantly increased engagement)

a. 1 2 3 4 5

19. What was your perception of the weekly Twitter chats? (open-ended response)

20. Were you aware that the instructor held weekly Blackboard Collaborate sessions during the course?

- a. Yes
- b. No

21. Did you attend any of the Blackboard Collaborate sessions?

- a. Yes
- b. No

22. To what extent did the Blackboard Collaborate sessions increase your engagement in the course? (1=did not increase engagement; 5=significantly increased engagement)
- a. 1 2 3 4 5
23. What was your perception of the Blackboard Collaborate sessions? (open-ended response)
24. Overall, how would you rate the impact that the engagement strategies (phone calls, instructor availability via phone/text, Twitter, and Collaborate) had on your engagement in the course? (1=did not increase engagement; 5=significantly increased engagement)
- a. 1 2 3 4 5
25. Overall, how would you rate the impact that the 3 engagement strategies had on your learning in the course? (1=did not impact learning; 5=significantly impacted learning)
- a. 1 2 3 4 5
26. To what extent do you believe the use of the engagement strategies (phone calls, instructor availability via phone/text, Twitter, and Collaborate) will have on your future classroom instruction as a K-12 SPED teacher? (1=will have no impact; 5=will have significant impact)
- a. 1 2 3 4 5
27. Specifically, how will the use of the engagement strategies in your CCU SPED courses during the fall 2016 semester impact your classroom instruction? (open-ended response)
28. Please share any additional comments regarding the engagement strategies used in SED 500, 502, and 512. (open-ended response)