

A Mixed Methods Analyses of Student Knowledge, Perceptions, and Application of
Universal Design for Learning

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2022 SoTL Grant Proposal

December 1, 2022

Abstract

Given the diverse learning needs of students in today's classrooms, general education teachers' have an increased responsibility to ensure learning for all students, including students with disabilities. While a majority of teachers understand the benefit of meeting the academic needs of all of their students, research suggests that preservice and in-service general education teachers often do not feel as though they have been adequately prepared with the knowledge and skills needed to effectively work with diverse learning needs. One suggested way to increase preservice teachers candidates' perceptions of self-efficacy when working with these student populations is to more effectively prepare them to apply principles of Universal Design for Learning (UDL). Planning with UDL in mind allows teachers to proactively embrace the diversity in their classrooms and effectively plan instruction that creates more inclusive opportunities and allows all students to successfully achieve their learning goals. This evaluative study is being conducted to replicate similar previous research using coursework and candidates at UNC Charlotte. This practical research can be used to inform programmatic content and experiences of all general education teacher candidates within the Cato College of Education (CCOE). In alignment with the University and CCOE's strategic plans, this study seeks to use a mixed methods design to evaluate how students' participation in EDUC 4290: *Modifying Instruction to Meet the Needs of Diverse Learners* helps to produce educators who know how to create educational equity by effectively planning accessible and inclusive learning experiences for all learners.

**SoTL Budget Request Page
January 15, 2023 to June 30, 2023**

BUDGET: Request by budget category. Joint proposers must select one PI to be the lead and one department to receive this allocation.

Lead Principal Investigator: Dr. Holly Johnson

Principal Investigator 800#: 801061258

Title of Project: A Mixed Methods Analysis of Student Knowledge and Perceptions of Universal Design for Learning

Allocate operating budget to Department of: Special Education and Child Development

Fiscal Year One (January 15, 2023 to June 30, 2023)		
Faculty Stipend	Paid directly from Academic Affairs fund on May 15, 2023	\$5,000
911250	Graduate Student Salaries	
911300	Special Pay to Faculty other than Grantee	\$5,000
915000	Student (Undergraduate or Graduate) Temporary Wages	
915900	Non-student Temporary Wages	
920000	Honorarium (Individual(s) not with UNCC)	
921160	Subject Incentive Fee	
925000	Domestic Travel	
926000	Foreign Travel	
928000	Communication and/or Printing	

930000	Supplies	
942000	Computing Equipment	
944000	Educational Equipment	
951000	Other Contracted Services	
Total Amount Requested		\$10,000

Budget Narrative

To complete the proposed research study, a total of \$10,000 in financial support is being requested. The project aligns with the intent of the SoTL grants program by requesting support for the evaluation.

Faculty Stipend (\$5,000 per faculty member- Johnson, Wakeman)

A stipend of \$5,000 is requested in May, 2023 for Drs. Holly Johnson and Shawnee Wakeman as a summer stipend. Dr. Johnson is responsible for teaching multiple sections of EDUC 4290 throughout the year. As a new faculty member, Dr. Johnson recognized the need to increase the expertise and experiences of the general education candidates to be better prepared to design and implement inclusive lesson plans that meet the needs of all potential learners in their classrooms. She enlisted the help of Dr. Wakeman to help address the knowledge and experience gaps by supporting their understanding of all students, including those with a full range of disabilities. As they have worked together on previous projects and disseminated information (i.e., published manuscripts, reports, and conference presentations at the state and national levels), Drs. Johnson and Wakeman have a strong record of completing projects and disseminating findings. Together they collaborated to write the IRB proposal. For this project, they will collaboratively conduct all quantitative and qualitative analyses using the consented data from two sections of EDUC 4290. They will disseminate findings in a manuscript and will present to the CCOED Leadership team, CCOED faculty and any appropriate SoTL presentations.



November 28, 2022

Dear SoTL Committee Members,

I am pleased to offer my support for the SoTL grant proposal, “A Mixed-Methods Analysis of Student Knowledge, Perceptions, and Application of Universal Design for Learning”, submitted by Drs. Holly Johnson and Shawnee Wakeman. In an annual report on the condition of education, the National Center for Education Statistics (2022) reported that, in the fall of 2020, 66% of students with disabilities spent 80% or more of their instructional time in general education classes in regular schools. While this percentage is higher than it has been in previous years, there has only been a 7% increase in this number of students since fall 2009. Based on the dismal increase this student population is experiencing, it is vital that teachers be not only inclusive but also effective in addressing the diverse learning needs of all students.

However, research suggests that preservice general education teachers often report not feeling adequately prepared with the knowledge and skills needed to effectively design instruction to meet the diverse learning needs of all students, especially students with disabilities (Fuchs, 2010; Gee et al., 2020). One way to help teachers develop the essential skills needed to facilitate accessible, equitable, and inclusive learning opportunities for all students is through the training and application of Universal Design for Learning (UDL) as an instructional design framework.

Recently, the authors of this proposal led efforts to more intentionally incorporate explicit instruction and application opportunities on UDL into a course (i.e., EDUC 4290) preservice general education teachers typically take the semester prior to student teaching. The primary objective of this proposed project is to analyze preservice general education teachers’ knowledge, perceptions, and application of UDL as it relates to their ability to create accessible and inclusive learning opportunities for all students. This proposed project is very timely and relevant. Given the benefits inclusive opportunities provide both students with and without disabilities, it is important that we provide our teacher candidates with the tools they need to be successful in effectively designing lesson plans that are accessible to and inclusive of all students. I wholeheartedly endorse this proposal.

Sincerely,

A handwritten signature in black ink that reads "Malcolm B. Butler".

Malcolm B. Butler, Ph.D.
Dean and Professor of Science Education

Specific Aims

Purpose and Objectives

This project is a comprehensive evaluation of two sections of EDUC 4290, and its impact on preservice general education candidates' knowledge, perception, and application of Universal Design for Learning (UDL) as an instructional design framework to create more accessible and inclusive learning opportunities for all students. EDUC 4290 is designed to support general education teacher education candidates (n= 592 enrollment in 2021-2022) to use strategies within planning instruction to meet the learning needs of all students in classrooms K-12, including students with disabilities. Additionally, this course is designed to address three critical elements in teaching in inclusive classrooms: (a) knowledge of strategies to meet the needs of diverse learners, (b) perceptions and beliefs about teaching and learning that shape individuals' dispositions as educators, and (c) ability to apply practical instructional and learning strategies that make instruction effective for students with diverse learning needs. However, in recent reviews of this course, limited information was found on the instruction and application of UDL. In addition, it was noted that discussion regarding several student populations' (e.g., students with extensive support needs) access to and involvement in general education were not being adequately included. Recognizing the need to increase the expertise and experiences of general education preservice candidates to be better prepared to design and implement inclusive lesson plans, intentional efforts were made to provide opportunities for candidates to apply principles of UDL within planning.

Our primary objective is to evaluate the impact of EDUC 4290 on general education preservice teachers' knowledge, perception, and application of UDL in designing accessible and inclusive learning opportunities for all students, including students with disabilities. We will

complete this objective by conducting formative evaluation using multiple data sources. This evaluation will provide us with information useful in improving our general education programs within the Cato College of Education (CCOED). The primary audience of our evaluation is general education program faculty as they are the decision makers about program development and revision.

Research Questions

1. What is the knowledge of general education teacher candidates regarding UDL strategies to meet the diverse learning needs of students?
2. What are the perceptions of general education teacher candidates regarding the use of UDL within planning to address barriers to instruction for all learners?
3. What is the ability of general education teacher candidates to apply practical instructional and learning strategies that make instruction effective for students with diverse learning needs?

Rationale and Impact

The goal of UDL is simple: providing equitable and inclusive access to general education curriculum for all students. The application of this framework during instructional design has the potential to increase positive outcomes for both teachers and students by intentionally removing unnecessary barriers to learning (Meyers et al., 2014). Viewed as a framework that can increase inclusive opportunities while simultaneously decreasing the number of accommodations and modifications students with disabilities may need, the UDL framework has demonstrated positive academic outcomes in both special and inclusive general education classrooms for students with disabilities (Browder et al., 2009; Coyne et al., 2012; Kortering et al., 2008; Lieber et al., 2008; Lowrey et al., 2019); however, research has shown that UDL is rarely used in

general education settings (Basham et al, 2010; Ralabate, 2011). While teachers understand the benefit of meeting the academic needs of all students, many teachers have identified challenges in understanding how to adapt their instruction to adequately meet learning goals of students with more diverse needs (Spooner et al., 2007). Furthermore, Lowrey et al. (2017) reported the difficulty in locating general education classrooms with systematically implemented UDL-based instruction.

Given the diverse learning needs of students in today's classrooms, preservice teachers' are tasked to ensure success for all students, including students with disabilities. Our project aligns directly with the University's strategic plan (Action 3.1.1 providing candidates with tools connecting their education to career goals and personal growth) and the CCOED's vision (to be a leader in educational equity through excellence and engagement) and strategic plan (articulating the need for infrastructure and resources to support our candidates to be transformative leaders in their endeavors). Based on this charge and the field of education's need to prepare more effective and inclusive teachers, the PIs of this project worked to address the knowledge and experience gaps of preservice general education teachers related to creating more accessible and inclusive learning opportunities for all students, including those with a full range of disabilities.

This SoTL project is designed to evaluate the extent this objective was met, and to inform future course development through the use of formative evaluation methods. This methodology using existing candidate performance and perception data allows us to determine how well course changes have addressed candidate knowledge, perceptions and use of UDL strategies. Findings have the potential to shape instructional design and delivery, application opportunities, and supports provided to preservice general education teachers across multiple departments (e.g., elementary education, secondary education, arts education) in the CCOED, and potentially

inform instructional practices nationally for other educational candidates through project dissemination.

Literature Review

Research suggests that preservice and in-service general education teachers often do not feel as though they have been adequately prepared to effectively work with students at-risk for or with disabilities (Fuchs, 2010; Vitelli, 2015). One suggested way to increase preservice teacher candidates' perceptions of self-efficacy when working with these student populations is through instruction on UDL. However, research indicates that UDL is not commonly incorporated into general education teacher preparation programs. Vitelli (2015) administered an online survey to general education faculty members in programs that were awarded Teacher Quality Enhancement grants. According to results of the survey, many respondents reported being aware of UDL (60.34%), while only 24.14% reported teaching it, indicating that instruction of the framework has yet to be considered as a standard topic to be taught within and across preservice general education teacher preparation programs.

Additionally, researchers suggest further research should be conducted to examine general education preservice educators' perceptions of their knowledge and abilities in UDL and the application of incorporating these principles within instructional design. Expanding the work of Spooner et al. (2007) and Courey et al. (2012), Owiny et al. (2019) surveyed preservice teachers on their perceptions of including students with disabilities in their future classrooms prior to and after providing instruction in UDL. Additionally, researchers analyzed preservice teachers' ability to effectively apply principles of UDL during lesson plan design. Using a mixed methods design, results of this study indicated that, between baseline and post intervention, preservice teachers increased their knowledge of how to effectively plan instruction using the

principles of UDL; however, preservice teachers demonstrated little growth between postintervention and the end of the semester. These results suggest that, while preservice teachers can acquire the knowledge needed to construct lesson plans that are inclusive of principles of UDL, more explicit modeling and opportunities to receive feedback are needed to ensure continuous improvement.

Lastly, Unluol Unal and colleagues (2022) examined the effectiveness of an individually paced online UDL training on general education teacher candidates' daily lesson plan writing skills. Using a pretest-posttest design, lesson plans from 97 general education preservice teachers were examined to determine if there was a statistically significant difference between participants' scores on their lesson plans after receiving instruction. During this study, general education preservice teachers experienced training that provided explicit instruction on adapting lesson plans for students with disabilities. Additionally, participants engaged in interactive small-group activities, allowing candidates the opportunity to apply newly acquired skills. Results from this study demonstrated positive statistically significant differences between scores on participants pre- and post-test. Consistent with previous research, these findings suggest that training on UDL was successful in increasing candidates' lesson plan writing skills and their ability to effectively plan instruction that created more responsive learning environments for all students.

Planning with UDL in mind allows teachers to proactively embrace the diversity in their classrooms and effectively plan instruction for diverse learners. While these studies provide examples of the positive outcomes preservice general education teachers can experience upon receiving explicit instruction in UDL, the scarcity of research in this area and limited inclusive opportunities for students with disabilities suggests there is still substantial work that needs to be

done to help increase preservice teachers' confidence and ability in meeting the diverse learning needs of all students in their classrooms. Therefore, this evaluative study is being conducted to replicate previous research with candidates at UNC Charlotte. This practical research can be used to inform programmatic content and experiences of all general education teacher candidates within the CCOE. In alignment with the University and CCOE's strategic plans, this study seeks to evaluate how students' participation in EDUC 4290 helps to produce educators who know how to create educational equity by effectively planning accessible and inclusive learning experiences for all learners.

Method

Our evaluation methods mirror best practice using both student performance data and candidate course evaluation data. Given our objective for the project and three specific research questions, we plan to use an objectives-oriented evaluation approach. The information gained from this type of evaluation will specifically help us determine the impact of course changes related to the infusion of UDL had on candidate knowledge, perceptions, and application. Specifically, we will follow a Tylerian evaluation approach (FitzPatrick et al., 2023). This evaluation model starts with creating established objectives (written in behavioral terms), moves on to collect data (in our case, from candidates within EDUC 4290), and compares the performance data with the objectives (our candidate data with our objective) to determine the success of our approach (to infuse UDL successfully, increase student knowledge, and change if needed student perceptions about meeting the needs of diverse learners within planning).

In our project, the consent for these candidate data sources will be collected after the grades are submitted so as to not influence student performance or perspective within the data. All data - student lesson plans, discussion boards, within course surveys, course evaluations- are

available either through Canvas or the course evaluation system. While interviews with students could enhance the data, we anticipate that the discussion board posts will function in a similar fashion to provide their perspective. One aspect that we are missing by using existing data is student perceptions about what additional content and activities they believe would further strengthen their readiness for creating inclusive lessons. In the future, this question could be added to the end of course survey.

Evaluation

Data Sources and Procedures

The expected outcomes for this evaluation project include increased candidate: (a) understanding of the principles and guidelines of UDL; (b) stated importance for the use of UDL when planning; and (c) application of UDL within their lesson plans to make instruction effective for students with diverse learning needs. As we have three research questions we will use existing data to measure candidate knowledge, perceptions, and application of UDL. There are multiple sources of data over the course of the semester which we will collect. As part of the requirements for EDUC 4290, students are asked to complete weekly virtual discussion posts which are designed to engage students in content related discourse on the practical application and outcomes of topics that have been discussed in class. In addition, students are asked to construct a total of six lesson plans, during which they are asked to intentionally incorporate principles of UDL into the guided practice portion of the lesson. Once students have developed accessible learning opportunities for a majority of students, they are then tasked with reviewing five case study scenarios provided by the instructor. These scenarios challenge preservice teachers to consider if students in the scenarios are presented with any learning barriers based on their current instructional design and if so, how those barriers can be removed using principles of

UDL. Feedback related to content and application is provided by the instructor on both of these assignments. Finally, mid- and end-of-course evaluation ratings and comments are provided by students.

Analysis

We propose a mixed methods analysis of the data using both quantitative and qualitative approaches. Both types of data provide a richer understanding of the impact of the UDL content and activities on candidate knowledge, perceptions, and use. For the quantitative data analysis, we will conduct a frequency count of UDL guidelines present in candidate lesson plans through the candidates' semester. We will compare candidate UDL evidence across lesson plans using course rubrics, aggregated by all candidates and disaggregated by semester of the course and candidate characteristics such as type of program and academic year. Course evaluation ratings for two specific items regarding how much the candidate learned in the course and was the candidate challenged within the course will be reported. For the qualitative data analysis, the two researchers will conduct a thematic analysis by coding the feedback provided on the lesson plans over time, the content within the discussion board posts, within course surveys responses and course evaluation comments. Both researchers will code all of the content and come to consensus on themes, codes (using a codebook with a small set of pre-codes and then using data sources to identify emerging codes), and the application of codes. Researcher notes will be used to refine codes across data sources. Candidate UDL knowledge will be measured via lesson plan frequency count, course evaluation ratings, and discussion boards. Candidate perceptions will be measured using the discussion boards, within course surveys and course evaluation ratings and comments. Candidate application will be measured using lesson plan frequency count and rubric scores as well as discussion board content.

Dissemination

First, we will present findings to the CCOED Leadership team. We will share our plan to continue to address diversity and inclusion within EDUC 4290 as well as recommendations regarding the implementation of collaborative classes and activities as a result of the findings from this study. We will present our findings and recommendations for programs' consideration in fall 2023 CCOED faculty meeting. Second, we agree to permit SOTL to disseminate our proposal, final report, and any related output on the SOTL website and UNC Charlotte communications. We will also present our findings during UNC Charlotte's Teaching Week or at the SoTL Conference. Finally, we will submit a manuscript of the work for publication to the *Journal of Teacher Education and Special Education* to disseminate to wide readership.

Human Subjects

This study will involve human subjects. An IRB proposal has been submitted for approval. The IRB protocol ID number is IRB-23-0395.

Extramural Funding

SoTL funding is the sole source of funding.

Timeline

Date	Task
January, 2023	<ul style="list-style-type: none"> ● Secure IRB approval
February, 2023	<ul style="list-style-type: none"> ● Secure consents from students from sections of EDUC 4290 from Summer and Fall 2022 ● Aggregate quantitative and qualitative data from consented students

March-May, 2023	<ul style="list-style-type: none">● Complete quantitative analyses● Complete qualitative thematic analyses
June-July, 2023	<ul style="list-style-type: none">● Write and submit manuscript
June, 2023	<ul style="list-style-type: none">● Share data with Cato COED Leadership team with recommendations for programs
Fall 2023	<ul style="list-style-type: none">● Present project to appropriate departments and CCOED● Share final report with SoTL
Whenever appropriate	<ul style="list-style-type: none">● Present project methods, findings and outcomes in a SoTL designated format

References

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