

Preparation and Experiences for Implementation
Teacher Candidates' Perceptions and Understanding
of Universal Design for Learning

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As public schools strive to provide all students access to and success with the general curriculum, potentially leading them to postsecondary educational opportunities that prepare them for fulfilling and engaging careers, recent federal legislation clearly reflects the need to ensure that all students are supported in achieving rigorous educational goals. For this to happen, the legislation endorses various instructional supports and approaches that have been demonstrated to be effective in helping students achieve their educational goals (Edyburn, 2010). One of the instructional supports addressed in the legislation is Universal Design for Learning (UDL) (U.S. Department of Education, n.d.a). As the Individuals with Disabilities Education Act (IDEA) of 2004 and the Higher Education Opportunity Act (HEOA) of 2008 place their priorities on achieving educational standards for all students with varied abilities, including learners with and without disabilities, they also define UDL and regulate UDL to be implemented in educational programs for enhancing and maintaining high expectations for learners to guide their

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academic outcomes (U.S. Department of Education, 2004; U.S. Department of Education, 2010, n.d.b). For the first time, federal legislation through the Every Student Succeeds Act (ESSA) of 2015 endorses UDL (U.S. Department of Education, n.d.a).

However, there are issues affecting classroom implementation of UDL, addressing both teacher instruction and student learning, such as (1) a lack of research in the area of UDL (Edyburn, 2010); (2) the challenges to adopt and apply UDL principles among teachers (Kouterling, McClannon, & Braziel, 2005; Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007), and (3) the misconceptions of UDL and evidence-based practices among teachers (Basham & Marino, 2013; Meo, 2008). Therefore, it is essential for teacher candidates to understand UDL principles and maintain curriculum development that is accessible to students with varied academic needs (Courey, Tappe, Siker, & LePage, 2012; Spooner et al., 2007).

Review of the Literature

Current trends in education indicate that children with disabilities in K-12 education have gained access to the general curriculum with their typically developing peers in the general education classroom (Sindelar, Shearer, Yendol-Hoppey, & Liebert, 2006). Education policies such as IDEA (2004) and NCLB (2001) highlight standard-based education for all learners in general education curriculum (Meo, 2008; U.S. Department of Education, n.d.b). ESSA (2015), which replaced NCLB (2001) and reauthorized the Elementary and Secondary Education Act (ESEA), continues to address high academic standards and emphasizes more comprehensive educational support for all learners (U.S. Department of Education, n.d.a). Most recently, The Every Student Succeeds Act (ESSA) of 2015 endorses UDL (U.S. Department of Education, n.d.a)

In order to ensure that federal guidelines emphasizing high academic standards for all students are addressed it is essential for teachers to be equipped with knowledge and skills for preventing barriers affecting learners to access to the curriculum from occurring in their teaching practices. It is considered to be possible to remove preexisting learning barriers in the curriculum and bridge learners and their interactions with curriculum when UDL is applied to teaching and learning practices (CAST, 2014; Orkwis & McLane, 1998; Rose & Mayer, 2002). Specifically, this study adds to the body of literature on areas such as training teacher and teacher candidates on UDL; their understanding of UDL through the training; and their application of UDL to the real classroom as critical for facilitating access to general education curriculum for learners

with diverse abilities.). In order to make general education curriculum accessible to learners to the widest extent possible, UDL principles can be applied to curriculum and lesson development by teachers (Author, Matthews, & Smallwood, 2009; Meo, 2008).

The Meaning and Purpose of UDL

Universal Design for Learning (UDL) was first articulated by the Center for Applied Special Technology, or CAST, in the 1990s, and is considered to be a leading framework for educational reform for the 21st century (CAST, 2011.) As defined by CAST, UDL is a “research-based set of principles to guide the design of learning environments that are accessible and effective for all.” UDL addresses planning, teaching, and learning strategies to meet the needs of a broader population of students with varied learning styles and abilities without adding on accommodations or modifications (Author et al., 2009; Pisha & Coyne, 2001). This is more efficient and economical because it reaches a wider market of learners (Orkwis & McLane, 1998). Since UDL aims to provide learning environments functional for the most extensive number of learners possible, the needs for individualizing these environments can be minimized (Curry, Cohen, & Lightbody, 2006).

UDL assists in the planning of instruction and learning by developing curriculum through three core principles to meet diverse learning needs for individuals with varied abilities (CAST, 2011; Author et al., 2009). Within the UDL elements of teaching and learning activities, the components include ways teachers represent information; ways students can express knowledge; and ways students and teachers are engaged and motivated in learning. The UDL approach to teaching and learning is designed to make learning more accessible to all students (CAST, 2014).

UDL and teacher preparation. UDL principles have been examined and implemented since the 1990s (CAST, 2011). In accordance with Orkwis and McLane (1998), the ERIC/OSEP Special Project organized a stakeholder meeting on universal design in 1997. At that meeting, researchers and developers recommended teacher training programs prepare educators and teacher candidates to teach in universally designed learning environments equipped with UDL goals, methods, and materials (Orkwis & McLane, 1998).

In order for teachers to comprehensively and effectively implement UDL, it is critical that these teacher candidates receive training when they enroll in teacher preparation programs (Basham & Marino, 2013; McGuire-Schwartz & Arndt, 2007; Strobel, Arthanat, Bauer, & Flagg, 2007). In this way, the need for professional development for teachers

can be reduced without them having to catch up with other teachers who implement UDL in their classrooms (Basham & Marino, 2013).

There are four components in relation to the training of teachers and teacher candidates on UDL. These components are as follows:

- Teacher preparation programs need to train both general and special education teachers in the understanding of UDL principles and its application to the development of curriculum, unit, and lesson plans (Courey et al., 2012).
- Teachers and teacher candidates who receive training on UDL need to be provided ample practice opportunities for the planning and the implementation of UDL principles (Courey et al., 2012; McGuire-Schwartz & Arndt, 2007).
- More research on the effectiveness of UDL training is needed in the areas of lesson design and implementation (Basham & Marion, 2013; Spooner et al., 2007).
- Comprehensive observations on trainees' understanding of UDL principles and their performance of UDL application to their actual teaching in their classrooms are needed (Courey et al., 2012).

By examining teacher candidates' perceptions of their (1) understanding of UDL principles, (2) experiences and observations of how UDL is implemented in classrooms, (3) implementation and application of what they learned in relation to UDL and their classroom practices, and (4) experiences in (a) support, (b) resources, (c) procedures, (d) benefits, and (e) challenges related to understanding and implementing UDL, teacher preparation programs can better implement effective practices in preparing teacher candidates to meet individual student learning needs through practices supported by UDL.

Conceptual framework. The conceptual framework for this study is Universal Design for Learning (UDL). UDL as a conceptual framework addresses how teaching, learning, and curricula can be developed and transformed to be accessible for the widest extent of learners as possible (Meo, 2008; Rose & Meyer, 2002). Prior planning for students needs can be met by implementing modifications to curriculum features such as instruction, materials and strategies prior to delivery of instruction (Kurrts, Matthews, & Smallwood, 2009). The Center for Applied Special Technology (CAST, 2014) provides three core principles of UDL: (1) multiple means of representation; (2) multiple means of action and expression; and (c) multiple means of engagement. Because individuals have varied skills,

needs, and interests in relation to their learning, uniquely coordinated by individuals' brain networks, each of these three core principles are derived from activating the following brain networks: (a) recognition networks making connections with the what of learning; (b) strategic networks making links with the how to learning; and (c) affective network activating the why to learning (CAST, 2014). By considering how the human brain works through these three brain networks and using UDL core principles, teachers can locate multiple modes of instructional presentation of curriculum content, help student action and expression of how they learn, as well as establish student engagement in making sense of why they learn (CAST, 2014). This curriculum development process gives students flexible and accessible learning experiences through interaction with the curriculum (Orkwis & McLane, 1998). Therefore, a foundation of UDL is to develop curriculum through built-in features of varied representation of concepts, action and expression of what student acquire, and engagement of student motivation and challenges. In this way, students can activate their brain networks in what, how, and why to learn when they interact with the curriculum. This will reduce chances of students experiencing difficulty interacting with the curriculum due to their unique skills, needs, and interests that they utilize when they demonstrate this interactive learning (Orkwis & McLane, 1998). The conceptual framework is illustrated in Figure 1.

In order to further explore effective use and implementation of UDL in classrooms, the present study examined special education teacher candidates' perceptions toward UDL principles and applications to their field-based teaching experiences.

The following research questions guided the study:

1. How do teacher candidates enrolled in the major in special education: general curriculum and the dual major in elementary education and special education: general curriculum perceive their understanding of UDL?
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2. How do these teacher candidates perceive UDL implemented in classrooms through their field-based experiences?
3. How do these teacher candidates perceive their implementation and application of what they learned related to UDL to classroom teaching practices?
4. How do these teacher candidates perceive their experiences in (a) support, (b) resources, (c) procedures, (d) benefits, and (e) challenges related to understanding and implementing UDL?

Insights into how the teacher candidates conceptualized their understanding of UDL principles and application of these principles to teaching experiences in the field may help teacher educators in providing instructional and field experiences supported by the UDL framework.

Methods

A phenomenological approach was used to examine perceptions toward Universal Design for Learning (UDL) among teacher candidates in special education and dual major in elementary and special education (Bogden & Biklen, 1998; Nardi, 2006). Phenomenological qualitative research methodology allows researchers to describe experiences shared by a group of individuals based on a phenomenon (Creswell, 2007; Moustakas, 1994). The purpose of the study was to examine teacher candidates' perceptions toward Universal Design for Learning (UDL) in the following areas: (1) their understanding of UDL; (2) their experiences and observations in how UDL is implemented in classrooms; (3) their implementation and application of what they learned related to UDL to classroom teaching practices; and (4) their experiences in (a) support, (b) resources, (c) procedures, (d) benefits, and (e) challenges related to understanding and implementing UDL. To fulfill this purpose, the study explored the perceptions of teacher candidates in special education as well as teacher candidates in the dual major in elementary education and special education.

Participants

Participants in the study were female teacher candidates enrolled at a large southeastern university in the special education teacher preparation as well as teacher candidates majoring in the dual major in elementary education and special education. The teacher education program in special education has a focus on the general curriculum meeting the needs of students with high incidence disabilities (specific learning disabilities, emotional disabilities and mild intellectual disabilities).

Teacher candidates learn to (a) increase knowledge of students with high incidence disabilities, (b) deliver effective instructional strategies and interventions to work with students with high incidence disabilities in the general curriculum, (c) develop appropriate classroom management skills and behavioral interventions, (d) implement formal and informal assessment methods, and (e) demonstrate effective communication and collaboration skills with families, colleagues, and other professionals. The teacher preparation program in special education requires students to complete (a) general education (i.e., liberal arts) requirements; (b) coursework required for licensure by the state Department of Public Instruction; (c) and major coursework focusing on evidence-based practice for teaching high incidence disabilities (K-12) for effective instruction with the Common Core. They complete three early field-based experiences in special education settings and student teaching.

Teacher candidates enrolled in the dual major in elementary education and special education complete elementary education coursework as well as the program requirements in special education. Elementary education methods courses include three reading and language arts courses, two mathematics methods courses, a science methods course and a social studies methods course. The dual majors complete an additional early field-based experience so they have two early field-based experiences in elementary education classrooms and two early field-based in special education instructional settings. Both the teacher candidates in special education and the dual major in elementary education and special education complete 16 weeks of student teaching, with time spent in both an inclusive elementary classroom and a special education setting.

The participants were enrolled in the fall semester of the early field-based experience of the senior year before student teaching. A group of three teacher candidates in the special education teacher education program and a group of three teacher candidates in the dual major in elementary education and special education teacher education program participated in the study. Their participation was voluntary and was not a part of their course requirements or assignments.

Data Sources

Data were collected through five individual interviews, one focus group interview, and five lesson plan reviews. In this data collection, there were four data sources: (a) the individual interviews, (b) the focus group interview, (c) the lesson plan reviews, and (d) descriptive and reflective field notes. Figure 2 shows the participants' majors and areas of participation in this study.

Four participants from the major in special education as well as the

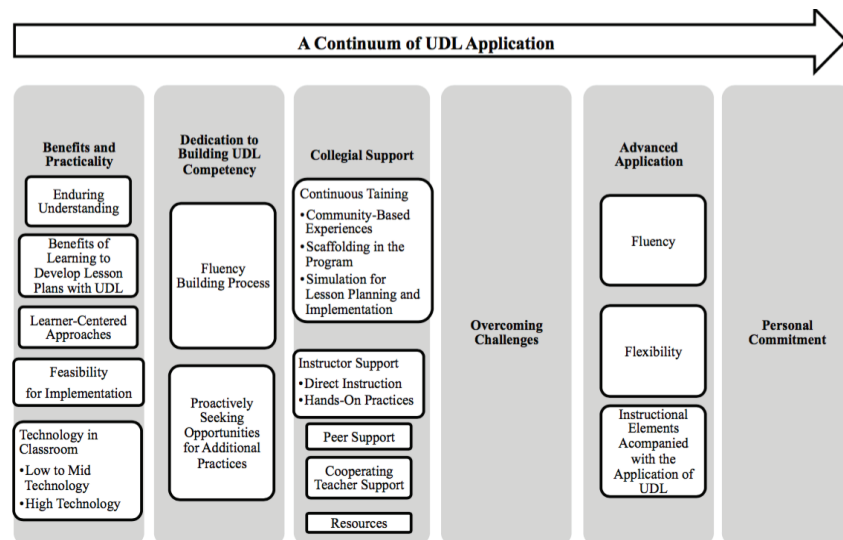
dual major in elementary education and special education participated in the individual interviews, the focus group interview, and the lesson plan reviews. One participant in special education engaged in the individual interview and the focus group interview without participating in the lesson plan review. Another participant majoring in special education engaged in the lesson plan review without participating in the individual interview and the focus group interview due to health concerns at the time of the study.

Data Analysis

Qualitative data analysis was conducted after the data collection was performed through four data sources: (a) the individual interviews, (b) the focus group interview, (c) the lesson plan reviews, and (d) the descriptive and reflective field notes. Data analysis in this study was a trifold procedure: (1) triangulating data through (a) the transcripts from the individual interviews and the focus group interview, (b) the lesson plan reviews, and (c) the descriptive and reflective field notes; (2) the member-checking with the participants; and (3) having the second reader

Figure 2

A continuum of UDL application. Adapted from “Map of Theme and Subtheme Relationships in the Process of Learning to Develop and Implement Lesson Plans Incorporating the Application of UDL Principles,” by N. Takemae, 2015, the University of North Carolina at Greensboro, p. 132. Copyright 2015 by Natsuko Takemae.



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for identifying themes and subthemes. This process was considered to increase the validity of the qualitative study (Creswell, 2007). Specifically, conducting the member-checking and having the second reader to identify themes among participants' responses ensured an enduring ethical validation (Creswell, 2007). Also, reviewing the descriptive and reflective field notes ensured a substantive validation (Bogdan & Biklen, 1998; Creswell, 2007). In addition to these validation strategies, an interrater agreement and a content analysis based on transcribed interviews with the second reader increased the reliability of this study (Creswell, 2007; Nardi, 2006).

The qualitative data was analyzed by coding, categorizing, and identifying themes (Chenail, 2012) through a triangulation of data such as (a) the individual interviews; (b) the focus group interview; (c) the lesson plan reviews; and (d) the descriptive and reflective field note. The researcher's notes taken throughout the data collection of (a) the individual interviews, (b) the focus group interview, and (c) the lesson plan reviews were used as the descriptive and reflective field notes. The open-ended individual interviews and the focus group interview were transcribed and their data analyses included the content analysis of data targeted to confirm or disconfirm inductive interpretation of these data (Miles & Huberman, 1994). The content analysis was performed by utilizing NVivo for Mac.

The lesson plan reviews were conducted by utilizing the lesson plan review protocol. First, by using the lesson plan review protocol, elements of UDL principles included in the participants' lesson plans were categorized into (1) before lesson, (2) during lesson, and (3) after lesson. Highlighted and categorized lesson plan elements were then subcategorized into subgroups. Second, the UDL principles from Universal Design for Learning Guidelines- Version 2.0 (CAST, 2011) were utilized to guide subcategorization of UDL features identified in the lesson review protocol. Each element of checkpoint features in the three UDL principles (CAST, 2011) served as subcategories. Third, the results of the lesson plan reviews were grouped according to the UDL principles; (1) multiple means of representation, (2) multiple means of action and expression in, and (3) multiple means of engagement.

Together with the descriptive and reflective field notes, themes and patterns evolving from the qualitative data analysis of (a) the individual interviews, (b) the focus group interview, and (c) the lesson plan reviews were subsequently discussed between the researcher and the individual participants. As discussing these components with participants, clarifications were made for the data analysis. In order to protect ethical research considerations, the researcher planned to recognize the subjectivity of

her own qualitative data interpretations, research position bias, and co-constructing ownerships of the data collection with participants (Creswell, 2007). For implementing this plan, this research involved the member-checking and the second reader.

Results

Results of the individual interviews and the focus group interview were highlighted and categorized into themes based on clusters of meanings. Emerging themes from individual interviews and the focus group were (1) benefits and practicality, (2) dedication to building UDL competency, (3) collegial support, (4) overcoming challenges, (5) advanced application, and (6) personal commitment. Based on these emerging themes, a continuum of participants' perception of their understanding and implementation of UDL principles were illustrated in Figure 2. UDL principles included in the participants' series of lesson plans were organized into categories such as (a) representation, (b) action and expression, and (c) engagement. Emerging patterns from the lesson plan reviews were consistent with themes emerging from the individual interviews and the focus group interview.

Emerging Themes and Subthemes

Subthemes were reported under each of the six emerging themes. The first theme, benefits and practicality, included the following subthemes: (a) enduring understanding, (b) benefits of learning to develop lesson plans with UDL, (c) learner-centered approaches, (d) feasibility for implementation, and (e) technology in classroom with low to mid technology as well as high technology. A total of 123 references in these seven subthemes determined the first theme. The second theme, dedication to building UDL competency, included the following subthemes: (a) fluency building process and (b) proactively seeking opportunities for additional practices. A total of 63 references in these two subthemes formed the second theme. The third theme, collegial support, included the following subthemes: (a) continuous training with community-based experiences, scaffolding in the program, and simulation for lesson planning and implementation, (b) instructor support with direct instruction and hands-on practices, (c) peer support with collaboration and co-planning opportunities, (d) cooperating teacher support, and (e) resources. A total of 249 references in these five subthemes established the third theme. The fourth theme, overcoming challenges, highlighted respective descriptions from the participants and included 35 references. The fifth theme, advanced application, included the following subthemes: (a) flu-

ency, (b) flexibility, and (c) instructional elements accompanied with the application of UDL. A total of 36 references in three seven subthemes determined the first theme. The sixth theme, personal commitment, informed the participants' action plans for utilizing UDL in the future and included 13 references.

First theme. The first theme to emerge from the individual interviews was the benefit and practicality of UDL. Subthemes derived from the first theme included (a) enduring understanding, (b) benefits of learning to develop lesson plans with UDL, (c) learner-centered approaches, (d) feasibility for implementation, and (e) technology in classroom. All participants described what UDL meant to them and the benefits of utilizing UDL principles in their teaching practices. They provided explanations of what UDL was according to CAST (2014). The participants also shared that a UDL lesson plan form, or template, helped them learn and guide their lesson plan development process to address multiple means of representation, action and expression, and engagement. Their perception of being able to develop learner-centered learning activities by following UDL principles was a recurring subtheme that emerged under this theme. Participants also described their perceptions of practicality for implementing UDL lesson plans in their field-based experiences. The uses of technology in their field-based experiences were unique among the participants. They described an importance of connecting student needs and technological resources available at school as an element of UDL application.

For example, Participant 1 stated

Sammy might learn better being lectured. Sally might learn better with visual aid. So, it's incorporating all of those different approaches into a lesson so you can reach every type of student... that's just being a good teacher... to me it's reaching each child that is engrained in us from the beginning about individualized education.

Participant 3 also shared

UDL is based off of the principles of ADA and making things accessible. ADA supports physical structures making them accessible for people with disabilities, and Universal Design for Learning is making content accessible for students who need multiple ways of representation, engagement, and expression. It's being able to give students the choice and giving them the option of expressing themselves or teaching them in the way that they know.

Second theme. The second theme to emerge from the individual interviews and the focus group interview was a dedication to building

UDL competency. The participants described their consistent practices in developing lesson plans by incorporating UDL principles throughout the program. Subthemes derived from the second theme included (a) fluency building process and (b) proactively seeking opportunities for additional practices. Observing student needs in their field-based experiences helped them practice in developing UDL lesson plans based on a real-world application. The participants described how they would incorporate UDL principles into their lesson plans by providing detailed and concrete examples. They also provided explanations for their personal choices to incorporate multiple means of representation, action and expression, and engagement into their lessons. Some participants indicated how they would like to proactively seek opportunities to grow professionally through having additional practice in developing and implementing lesson plans.

In relation to building UDL competency, Participant 4 explained

I'm doing four units small units and I'm teaching multiplying decimals, dividing decimals, and in-between those two, I taught divisibility rules. Right now, I have a student who uses a specialized pen so I always put that in my lesson to make sure that's under adaptations. I'm trying to be very explicit when I'm teaching too. I tend to go over things very frequently...some students need that...In my lesson plan I put that I will be using visual representations like the grid that I used which I'd never seen before for multiplying decimals. And I also related that to money as well, but that's a real-world application too, for any type of student, especially students who have disabilities and students who are English Language Learners. Usually it's a visual work, representation, emphasizing language that we were using in math. And since there is partner work I like to include that because having the working partners and having me coming around and monitoring as well helps with language development and it helps with them understanding the concepts.

Participant 5 shared

All of my special ed courses I have model UDL. When I use UDL it makes me think about what I am teaching and how I am going to engage them [the students], and then how I am thinking about independent work. I usually do my actual content in an activating strategy and the summarizing strategy first and then I make my assessment. Then I go into engagement and representation and I talk about what I did in my content.

Third theme. The third theme to emerge from the individual interviews and the focus group interview was collegial support in application of UDL. Subthemes appeared from the third theme included (a) continuous

training, (b) instructor support, (c) peer support, (d) cooperating teacher support, and (e) resources. Participants elucidated how their programs consistently supported their understanding and application of UDL principles through their coursework and field-based experiences. Community-based experiences, scaffolding in the program, and simulation for lesson planning and implementation were supportive program elements suggested by the participants. They also discussed models of UDL along with direct instruction, hands-on learning experiences, and frequent feedback they received from their instructors. Participants indicated the instructors' models were very helpful as they continued to learn to implement and apply UDL principles. Peer support, including opportunities for collaborative learning and co-planning lessons, were indicated as helpful as they could apply to real-world teaching practices. Cooperating teacher support was also indicated as essential in the effort to deepen their enduring understanding of UDL principles and their application.

As Participant 6 shared concerning collegial support:

The most helpful practice I have to say would be last semester when we did a math unit plan using UDL. We all wrote different ones, and we would give it to [the instructor] and [the instructor] would, help us revised it and we would give her all of our lesson plans. And then we had to make a poster showing the five days of the unit. We would show some of our examples of UDL lesson plans and we could to see everyone else's posters and how they interpreted different topics using UDL. And that was really helpful, because you saw different takes on different things, and we could ask each other questions. Another student and I had the same topic but she took it in a different direction than I did. And so, it was cool to see how she differentiated and how she scaffolded that was different than how I did. And I liked that a lot, because it was very helpful seeing that it's not just black and white picture, that UDL is very pliable, very flexible, and very much your own creation and how you interpret UDL makes your lesson plan. So, it was very neat to see that and I'd never seen so many examples of UDL at one time, which is good. It was really good.

Fourth theme. The fourth theme to emerge from the individual interviews was the overcoming of challenges while advancing their competency in UDL application. Their challenges were related to improving their competency in UDL application as they constantly attempted to make professional growth in the program. Some participants suggested some activities they would like to engage for overcoming their challenges. Some other participants described their disposition to engage in more practices in field-based experiences.

Participant 2 shared:

I'm sure in the first few years of teaching, I'll be getting a little bit like "oh, no, I'm doing it wrong" or "it didn't work"... And I think that something that takes time. I don't think it's going to happen over night. So I think for me that it's just going have to happen with experience. I think a lot of it is like just being able to have the confidence and being able to assume the responsibility regardless of the outcome.

Fifth theme. The fifth theme to emerge from the individual interviews and the focus group interview was the use of advanced UDL application described by the participants. Subthemes emerged from the fourth theme were (a) fluency, (b) flexibility, and (c) instructional elements accompanied with UDL application. The participants reflected that their fluency in utilizing UDL principles for developing lesson plans and implementing them had improved compared to when they started the program. In the focus group interview, they discussed they felt they were prepared to constantly apply UDL principles in their field-based teaching experiences. They also explained that their perceptions of their own flexibilities when they encountered unexpected events during their lesson implementation. All participants agreed that they perceived their flexibilities in automatic responses to unexpected events while still incorporating UDL principles in their responses and were well prepared. The participants also described how they learned to utilize other instructional strategies such as direct instruction, evidence-based instruction, and differentiated instruction accompanied while applying UDL principles to their teaching practices.

Participant 4 explained advanced application of UDL in her teaching this way:

I recognize when I need to apply these principles, even if I haven't written anything down, knowing the student didn't get what I was trying to teach... I think now, how am I going to represent this problem in a different way to make sure he gets this so he can do it on his own? So, I'd automatically think flexible enough to include the principles.

Sixth theme. The sixth and final theme to emerge from the individual interviews and the focus group was personal commitment to implementing the UDL framework in instruction. The participants were asked for their perceptions of UDL application after they graduated from the program. They described that they would like to use UDL principles in their lessons in their future classrooms. Some participants explained they were very familiar with the application of UDL and its incorporation into their lesson planning. They explained that UDL principles were easy to implement and effective instructional tool for them. They indicated that they might make changes in how UDL lesson plan form

was composed in order to fit in areas of teaching focuses according to student needs in their classrooms. In the focus group interview, the participants' overall conclusion of discussions in relation to UDL was that their personal choices and preferences would be to utilize UDL principles in their classroom teaching to meet student needs across settings, special education and general education classrooms.

Participant 5 shared her example of personal commitment to implementing UDL in her teaching:

I am most comfortable with using it [UDL]. I'm feeling like I'm using it more than any other approach in my teaching. When I have my own classroom, I'll probably combine UDL with other strategies. I definitely think it would depend on content and what area that I'm teaching when I decide how to use the principles. So for example if I'm teaching a math unit I'm going to choose a math oriented lesson plan, but I would still make sure to put UDL concepts in lesson plans. I would love to teach younger grades and this would be perfect, because I'll have some students that will need that extra support, and some students that might be completely going above all the rest, and UDL will help me to be able to distinguish and differentiate between students.

Lesson Plan Reviews

The participants shared their lesson plans developed through their coursework for review in this study. Examples of UDL application are shown in Table 1. Through these reviews, it appeared that the participants included each of three UDL principles: (1) multiple means of representation in (a) perception, (b) language, math expressions, and symbols, and (c) comprehension; (2) multiple means of action and expression in (a) physical action, (b) expression and communication, and (c) executive function; and (3) multiple means of engagement in (a) recruiting interests, (b) sustaining effort and persistence, and (c) self-regulation in their lesson plans. In addition, subcategorizations based on UDL subprinciples along with their checkpoints under each of three UDL principles indicated which element of UDL subprinciples were addressed in their lessons. This result was consistent with the participants' descriptions regarding their understanding and application of UDL principles during the individual interviews and the focus group interview. As explained by these participants during the individual interviews and the focus group interview, these resources and activities made available in these lesson plans were individually unique. There were select UDL features that did not appear in some lesson plans. These features included options to optimize individuals' autonomy of learning as well as to maximize transfer and generaliza-

tion of knowledge; however, the absence of these subcategories was not consistent across lesson plans.

Discussion

This study supported the following: (1) an enduring understanding of UDL among teacher candidates is developed through constant reinforcement in coursework and field-based experiences after an initial introduction to its principles; (2) their collegial support system is a central key element of learning to develop and implement UDL lessons and constantly self-reflecting their UDL practices; and (3) a series of field-based experiences incorporating UDL supports their skill and confidence

Table 1
Examples of UDL Application in Lesson Plans

<i>UDL Principles</i>	<i>Examples of Activities</i>
Representation	<ul style="list-style-type: none"> • Activate prior knowledge by reading literature at the beginning of the lesson. • Provide pictorial representations throughout lessons such as for vocabularies used during instruction and representations of student research findings on a chart. • Provide auditory, visually, and literally introducing new vocabularies.
Action and Expression	<ul style="list-style-type: none"> • Have students acting out in a game of season charades for showing what they learned in the lesson. • Provide options for students to create math problems. • Utilize a SMART Board™ as a display for each season during Mr. Froggy clothing activities such as selecting season appropriate clothes. • Differentiate assessments for numbers of coins to use to answer math problems. • Provide opportunities to choose multiple media such as writing sentences, drawing pictures, and responding orally to show what students know about what they learned.
Engagement	<ul style="list-style-type: none"> • Instruct students through a nature walk outside classroom for experiencing senses of seeing, hearing, smelling, and feeling. • Make connections within the lessons to students' everyday living ("When you go home today, pick out your favorite thing in your room. Think about how much you would have to pay for that item".) • Instruct students to utilize cards illustrating different difficulty levels of problems to choose from for students. • Have students create a solar system hanger in independent practice.

building in teaching practices. Insights gained help researchers answer the research questions regarding understanding, implementation, application, and their experiences of and with UDL.

Implications for UDL Training

An application of UDL principles can make general education curriculum accessible to as wide an extent of learners as possible (Author et al., 2009; Meo, 2008). The effectiveness of UDL training has been studied by researchers in the field of education. This study focused on teacher candidates' perceptions toward their understanding, implementation, and application of UDL principles, as well as their perceptions of the learning process to accomplish these skills.

The program structure and its support system for teacher candidates learning to incorporate UDL principles can be an influential key component that encourages them to continuously build up their fluency when applying these principles to their field-based experiences. As Edyburn (2010) suggests, before concluding UDL training effects on generalization, the complexities of interaction among influential factors such as learning objectives, characteristics, support, technology, and outcome must be considered.

First, the UDL lesson plan form reinforcing use of UDL principles along with direct instruction can be easy to follow when it comes to planning UDL lessons and teaching these lessons in classroom. However, as addressed in this study, simply utilizing this lesson plan form for training teacher candidates on the application of UDL may not be as practical. The use of this lesson plan form was introduced in their first field-based experience, and practices to incorporate UDL principles by using this lesson plan form were carried out throughout their following semesters through scaffolding. The elements in this lesson plan were constantly modeled by instructors, practiced with guidance, and independently implemented by teacher candidates. Frequent feedback on their performance in UDL application is an essential element to improve their use of UDL principles and UDL lesson plans.

Second, there was a variety of learning opportunities outside coursework such as inclusive community-based projects and field-based experiences. Offering these opportunities to teacher candidates can complement what they learned in coursework during application of their knowledge to the field practices. These learning opportunities appeared to be aligned with their coursework addressing UDL principles and carefully chosen to meet their learning objectives. It is essential for teacher educators to plan for weaving interactions between learning objectives across coursework and learning opportunities in the community as well as in the field.

Third, technological resources are an essential piece of UDL principles for maximizing student learning. Learning to use new strategies with or without technology will take time to build fluency when utilizing them and making them as one's own. It is expected that building proficiency when utilizing UDL principles including technology takes time for to master. Hands-on activities incorporating technology may need to be constantly reinforced through coursework and field-experiences so that teacher candidates will be able to naturally incorporate this element of UDL into their teaching practices.

Fourth, scaffolding experiences were carefully developed in the program for teacher candidates to practice utilizing UDL principles. Through coursework and field experiences, they engaged in a series of teaching practices in UDL. Teacher candidates' experiences in the process of learning to incorporate UDL into instruction can be unique due to their background and field practices. Concepts learners take away from what they were presented may vary according to their experiences and perceptions. For example, some teacher candidates voluntarily spent additional hours in field-experiences outside of program requirements. These additional experiences in the field may enhance their progress in acquiring and demonstrating UDL principles.

In the field of education, there are needs for teacher preparation programs to train teacher candidates for the use of UDL principles in their lesson planning (Spooner et al., 2007) while these hidden interactions during UDL training. This study suggests that a series of hands-on experiences in the field provides authentic application practices to incorporate UDL in their teaching. This will also encourage them to self-reflect upon their actual implementation with feedback from their university supervisors, peers, and cooperating teachers. This learning cycle, in addition to UDL training in courses, may provide a comprehensive practice for teacher candidates in the process of acquisition and application of UDL principles.

Recommendations

This phenomenological study with six teacher candidates in special education and the dual major in elementary education and special education may add an insight into effective ways of preparing teacher candidates acquire and apply UDL principles to their teaching practices. Further research is needed to investigate the complexities of interactions between these teacher candidates' prior experiences, opportunities through which they learn to incorporate UDL to their lessons, and additional practices that they may engage in during UDL training. Future

research on UDL training among teacher candidates needs to address classroom observations of their actual performance on the implementation of UDL principles in their instruction as well as a longitudinal study observing the long-term effects of UDL training on their teaching practices after they graduate from the program.

In this study, there were several concerns that need to be addressed in future research. This study did not address classroom observations although field-based experiences in practicing lesson implementation were an essential element of learning when utilizing UDL principles. Although ways that participants would implement their lesson plans were described through the individual interviews and the focus group, having classroom observations might have added further insight into how they would teach UDL lessons in classroom and what aspects of UDL principles they would emphasize in their teaching practices (Courey et al., 2012). Classroom observations are vital for providing feedback for teacher candidates, and this element needs to be included to comprehensively observe teacher candidates' perceptions of their understanding, implementation, and application of what they learned through training.

Perhaps another element to be considered in this study was the small sample of participants. The phenomenological study enables researchers to observe experiences among a group of individuals who share phenomena. In this study, the shared phenomenon was the participation in teacher preparation programs that focused on UDL training. A larger sample may provide wider views of teacher candidates' unique perspectives and experiences, and may also generate the focus group interview in different dynamics.

Another implication was to have all participants engage in every aspect of the study. Four participants out of a total of six engaged in all of the study components: the individual interviews, the focus group, and the lesson plan reviews. For instance, Participant 5 engaged in the individual interview and the focus group interview without participating in the lesson plan review by her choice to engage in the first two components of this study. Participant 6 engaged in the lesson plan review. However, the participant did not engage in the individual interview and the focus group interview due to health concerns at the time of the study. Even distributions of participation in the study may have further enriched the meanings of themes and patterns.

In this study, participants were identified as one sample group as they shared their experiences in a university teacher preparation program in a southeastern regional university in the US. Their shared phenomenon was the enrollment in this university's teacher preparation program.

In future research, grouping these participants based on their area of teacher preparation may inform researchers of unique perspectives toward UDL based on participants' educational backgrounds. It may also identify differences and similarities in these teacher candidates' perspectives toward their understanding and application of UDL principles. In this way, a more detailed agenda of teacher preparation for UDL may be identified based on teacher candidates' educational backgrounds and teaching areas.

By examining the application of Universal Design for Learning as a framework for meeting diverse instructional needs of all students with UDL teacher training and support, including resources, procedures, and benefits for teacher candidates, and exploring common challenges associated with implementation of UDL principles to classroom teaching and field-based experiences, teacher educators may discover more innovative and engaging ways to help teacher candidates meet the diverse needs of all of their students.

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