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The Effect of Universal Design for Learning on Student Engagement and Achievement in a Southwest Missouri School District

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by

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

The researcher's primary purpose in this mixed-method study was to investigate if teachers who applied Universal Design for Learning (UDL) to a unit of study noted increased engagement in students overall and in teacher-identified students considered "disengaged" compared to students in the same unit of study without the UDL methods applied. Additionally, the researcher sought to determine if students in a UDL course had more significant achievement than students in the same unit of study without the UDL framework applied. Primarily, the researcher aimed to ascertain if UDL would benefit the participating district's students, particularly those not utilizing special services.

Participants were asked to complete a three-hour course over UDL before the study began. Via a qualitative survey, teachers answered open-ended questions allowing data analysis that included defined themes of what student engagement and disengagement entailed. Additionally, the researcher asked teachers to categorize their students within their UDL and non-UDL classrooms into one of two categories: engaged or disengaged. The researcher used quantitative analysis to determine if there were differences in achievement between disengaged students in the UDL environment versus the non-UDL environment and differences in achievement between engaged students in both settings. The researcher used a Likert-type question format pre- and post-study via survey to determine growth in teacher mindset regarding student and teacher efficacy.

The results of this study were mixed. While the use of UDL did not show a difference in the increase in student scores from pre- to post-unit, there were positive results from training and the use of UDL in classrooms. Teachers saw increased student engagement and participation, increased enjoyment of content from students, increased

mindsets regarding students, and increased confidence in their abilities to help all learners.

This study demonstrated that UDL could increase engagement in students who had been previously identified as disengaged. It cannot be determined if UDL impacted student scores because the quantitative data showed similar scores between UDL and non-UDL classes. The size of this study and the fact that it was designed around a convenience sample of teachers limits its application beyond the district where the study was completed. That said, the results provide a positive implication for bigger studies with a broader scope of participants. Universal Design for Learning is a successful framework. This study only further demonstrates its success in reaching students outside the scope of special services for which research is lacking.

Keywords: Universal Design for Learning, Disengagement, Engagement, Achievement, Student Autonomy, Teaching Efficacy

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Chapter One: Introduction

Introduction

During this research study, educators entered year three of a global pandemic caused by Covid-19, which upended learning for students worldwide. Gaps in math and reading occurred due to instruction loss during school shutdowns, remote learning, and increased staffing issues, especially for historically marginalized students (Dorn et al., 2020; NWEA, 2021). Learning gaps were coupled with a decline in engagement (Toth, 2021). The declined engagement was not a new issue in education. Gallup polls from 2018 showed lagging student engagement, which increased as students progressed to higher grades (Hodges, 2018). More recently, students reported having 50% less motivation in school (Toth, 2021). Additionally, student motivation was the second leading cause of stress for teachers in the Missouri State Teachers Association (MSTA; Missouri Educator Wellness Survey, 2021).

Unmotivated students disengaged from learning tasks (Nayir, 2017; Saeed & Zyngier, 2012), which is the opposite goal of educators desperately trying to mend their students' gaps in learning. Teachers felt unprepared to handle the increasing gaps, especially with sporadic attendance (Gewertz, 2022). According to Muhammad (2018), students will find success when their teachers "believe they can learn at high levels and those educators work together to convince the students that they can achieve lofty academic goals" (p. 25). Educators must remove barriers to student learning and increase their efficacy in meeting students' needs to close the gaps (Muhammad, 2018).

Aside from increasing learning gaps, many colleges and employers emphasized in recent studies that high school students were not graduating with proper skills

(ASCD, 2022; TNTP, 2018). A 2018 study (TNTP) found that tasks students completed did not prepare them for college, due partly to a combination of low experiences and low expectations. The report found that "students spend most of their time in school without access to four key resources: grade-appropriate assignments, strong instruction, deep engagement, and teachers who hold high expectations" (p. 8). Borba (2021) and Doubet (2021) pointed to skill sets that can help students thrive, like the ability to persist, communicate, be creative, and set goals. These skill sets are embedded within the Universal Design for Learning (UDL) framework. When teachers use UDL consistently and purposefully, students can deepen their understanding of content and build the soft skills pertinent to success after graduation (Novak, 2022).

UDL brings equity to the classroom and reduces barriers to accessing material for any given content. Additionally, UDL increases student agency through choice and increased rigor and engagement, while holding students accountable to grade-level standards. Antonetti and Stice (2018), Fisher et al. (2018), Hattie (2012), and Willingham (2009) reported that students learn best through choice and right-sized challenges. It makes sense that UDL would engage previously disengaged students and thus increase student scores on assessments, possibly reducing learning gaps. A recent article from Fisher and Frey (2021) listed several barriers that led to disengagement and called upon teachers to "remove barriers that can slow student learning" (p. 77). Brain-based learning research affirms that for students to engage with content, the environment must be safe, the learning must be relevant and right-sized, and students must own their learning (Hammond, 2015; Hattie, 2012; Willingham, 2009). UDL can create all these learning necessities for students through thoughtful planning.

Rationale of the Study

In the GBH Education webinar (GBH), *Equity by Design: How UDL Provides Equal Opportunities to Learn*, Chardin and Novak (2020a) defined UDL's goal. "Every learner has access to grade level rigor in an inclusive environment with a teacher committed to being trauma-informed, culturally sustaining, and anti-discriminatory" (51:32). UDL was designed to provide equal access to learning, particularly for students with physical, emotional, and cognitive disabilities. As a result, UDL produces higher engagement for students with disabilities, reduces referrals to Special Education Services, and increases assessment scores (Abell et al., 2011; Posey & Novak, 2020; Spencer, 2011). However, there is limited research on the effects of UDL on students without documented disabilities who fail to persist in daily learning. These students might come from low socio-economic status, lack parental support, suffer from undisclosed mental illness, or be marginalized, due to language or diversity barriers. These students fail to engage with content, claiming boredom or anger, and accumulate missing assignments and low scores (Chardin & Novak, 2021; Flores & Brown, 2019; Hanna, 2014; Jensen, 2013). Teachers might call these students unmotivated, disengaged, or lazy (Hammond, 2014). UDL calls upon teachers to reframe their approach to learners to mitigate the effects of assumptions regarding low-performing students.

Such deficit thinking further alienates students who are struggling to find success at school. Almarode et al. (2021) emphasized that teachers' "beliefs and misconceptions about how students learn can challenge their capacity to create, fashion, and execute great learning by design" (p. 38). Likewise, Chardin and Novak (2020b), in the GBH Education webinar, *Teaching Science Through the Lens of UDL,* noted that educators

must stop predicting students' futures with labels (23:25). In similar presentations, they emphasized that labeling students led to "low expectations, remedial learning expectations, and marginalized experiences" (GBH Education Webinar [GBH], 2020a, 43:40). According to Mohammed (2018), students' cognitive abilities are already labeled by the time they enter high school. Educators must be intentional about building safe places for learning that honor students' differences and provide peak moments of success. All students have the potential to learn (Willingham, 2009). Educators can tap into that potential by empowering students through choice in their learning experiences (Meyer et al., 2014; Novak, 2021). UDL has the power to demonstrate trust and safe learning environments by offering students multiple pathways to understanding rigorous standards and increasing student confidence and engagement, ultimately leading to better student outcomes.

Antonetti and Garver (2015) found that listening was the primary task of learning in which most high school students are asked to engage. Educators must expand their strategies if one way of presenting content creates a barrier to learning. UDL guidelines promote various ways for students to engage in learning. The personal story of Todd Rose (2017) regarding his life from a high school dropout to a Harvard graduate fueled his work on debunking the idea of an average student. His work on learner variance reinforced the tenants of UDL (Meyer et al., 2014). In agreement, Willingham (2009) argued that assigning the same work to all students is "self-defeating" for teachers (p. 21). Teachers using UDL expand the learning strategies they employ and reach more students.

Chew's (2021) research demonstrated that "despite the research showing the complexity of learning, students and teachers often hold simplistic, flawed understandings of how students learn" (p. 2). He outlined many obstacles to learning, such as distraction and information overloading, but also suggested many solutions to combat these obstacles. The solutions Chew (2021) suggested can be embedded in lessons through the UDL framework. Because UDL is based on learning science, the strategies tackle many challenges before they begin. For example, motivation to engage in learning tasks can increase when variability is considered and planned for in lesson design. Almarode et al. (2021) affirmed that motivation is a crucial part of learning, which can "only move forward if learners have the desire or willingness to commit the necessary effort to acquire, consolidate, and store declarative, procedural, and conditional knowledge" (p. 45). Motivation is encouraged with right-sized challenges and support for those challenges (Chipchase et al., 2017). The UDL framework embeds these best practices into lesson design:

> Variability demands corresponding flexibility in the learning context if each student is to find an inviting, appropriately challenging, and supportive experience. A universally designed learning environment is planned around learning goals and the predictable range of variability. (Meyer et al., 2014, p. 52)

Meyer et al. (2014) stressed that teachers could proactively address potential barriers students might face, thereby increasing students' motivation to engage in tasks.

According to Fisher et al. (2018), researchers and educators cannot deny the link between motivation and engagement. "When students are engaged and connect learning with their everyday lives, they are 14 times more likely to be academically motivated"

(Fisher et al., 2018, p. 149). Additionally, Hattie (2012) linked self-motivation to contentment and pleasure in the learning tasks (p. 42). If a student does not carry the "inherent desire" to engage in a learning task, then it is up to the teacher to motivate through engaging content (Weisman, 2014, p. 105). UDL builds engagement through instructional choice (Mrachko & Vostal, 2020). Choice and multiple means of engagement support increased motivation for students to persevere through classroom work. Meyer et al. (2014) shared that UDL can help "discouraged, unmotivated learners catch fire when given ways to learn that are optimized for their particular strengths and weaknesses" (p. 3). Teachers who provide students with multiple representations of content in all phases of learning increase students' potential for success through engagement.

Purpose of Study

The researcher's primary purpose in this mixed-method study was to investigate if teachers who applied Universal Design for Learning (UDL) to a unit of study noted increased student engagement overall. Furthermore, the study explored whether students whom teachers considered disengaged would demonstrate increased engagement compared to disengaged students in the same unit of study without the UDL methods applied. Additionally, the researcher sought to determine if students in a UDL course had more significant achievement than students in the same unit of study without the UDL framework applied. Primarily, the researcher aimed to ascertain if UDL would benefit the participating district's students, particularly those not utilizing special services.

Via a qualitative survey, teachers answered open-ended questions, allowing data analysis that included themes of student engagement and disengagement. The researcher

compared these themes with themes from the literature on student engagement and disengagement. Additionally, the researcher asked teachers to categorize their students within their UDL and non-UDL classrooms into two categories: engaged or disengaged. The researcher used quantitative analysis to determine if there were differences in achievement between disengaged students in the UDL environment versus the non-UDL environment and differences in achievement between engaged students in both settings.

The researcher asked participating teachers to complete a three-hour learning course covering UDL methodologies, based on research studies using similar training for educators. The district provided the course. The purpose of the course was to bring clarity and consistency to teachers regarding the expectations of using UDL in the classroom and the principles of UDL. UDL was a district-created option for professional learning for all teachers in the district's professional learning courses located in Canvas, the district's Learning Management System (LMS).

Research literature suggested that training teachers in UDL produced positive outcomes. Though focused on post-secondary education, Lombardi et al. (2015), Schelly et al. (2011), and Wynants and Dennis (2017) discussed the positive impacts students noted after faculty and staff were trained in UDL. These impacts included not only increased awareness but the implementation of best practices. Courey et al. (2012) similarly found that training teachers in UDL continued to impact their instruction long after the initial implementation. Adelman and Taylor (2017) noted:

> An increased understanding of motivation clarifies how essential it is to avoid processes that limit options, make students feel controlled and coerced, and focus primarily on "remedying" problems. Such practices are seen as likely to produce

> avoidance reactions in the classroom and school and thus reduce opportunities for positive learning and developing positive attitudes. (pp. 5-12)

Further, Wiesman's (2012) study disclosed that teachers often misalign the strategies that affect student motivation, placing the wrong emphasis on ineffective methods. These findings suggest that UDL training is imperative to reinforce the framework expectations and increase knowledge regarding what drives motivation and engagement. Novak (2022) rightly asserted, "educators are working way too hard to not have a greater impact on all learners" (p. 135). Based on this research, teachers in this study participated in UDL training and provided additional support.

The researcher provided teachers with a list of strategies and other resources after training, which one of the district instructional coaches used in UDL training for teachers. These resources outlined options for how students learn content, practice content, and are assessed over the content. Teachers had the autonomy to choose which UDL practices best matched the unit of study and needs of the various learners in their classrooms. Teachers' efficacy builds through mastery experiences, supported autonomy, and evidence-based practices (Gabriel et al., 2011; Guskey, 2021; Ikemoto et al., 2012; Knight, 2013). Outcomes of this study offer the potential to impact future training, teacher practice, and ultimately student efficacy and achievement in the district.

Students of teachers with high efficacy increased success in school (Hattie, 2012). Novak (2022) recommended that educators on the UDL path rely on a team of teachers to share ideas and slowly dismantle ingrained ways of thinking, because it takes time and trial and error with various strategies to find what works best. Efficacy in principles and application of UDL increases with consistency, teamwork, and incremental steps. Just as

educators want students to try, fail, and try again, so must teachers embrace the same growth mindset for themselves. Novak suggested that the PLC process could help support the success of UDL implementation. True PLCs embrace UDL, because the goal is to "ensure higher levels of learning for every student" (Mattos, 2016). UDL beliefs and principles can drive PLC work in schools to bring success to all students.

Hypotheses

The researcher hypothesized that increased engagement would positively impact student achievement and thus sought to determine if there would be differences between student grades in the UDL and non-UDL courses. Additionally, the researcher questioned if engagement was a precursor to grades and examined if teacher-identified, disengaged students' grades differed from teacher-identified, engaged students' grades.

Hypothesis 1:

H_1: There is a difference in increases in unit grades of students who participate in UDL than students who do not participate in UDL.

Hypothesis 2:

$H_{2:}$ There is a difference in unit grade increases of students whom teachers identified as disengaged who participate in UDL than those who do not participate in UDL.

Research Questions

This study's overarching focus was on teachers' perceptions of engagement in students participating in units where teachers applied UDL principles. Furthermore, what were teachers' perceptions of those students, and what impact did training have on teachers' perceptions of students and sense of efficacy in helping those students? The

researcher expected to validate UDL as a teaching framework and planning strategy to increase engagement in students not identified through special services in a school district in Southwest Missouri with the ultimate goal of closing achievement gaps.

RQ1: What characteristics do teachers use to identify students as engaged or disengaged?

RQ2: What are teachers' perceptions of engagement in students previously noted as disengaged in classes incorporating UDL?

RQ 3: What are teachers' perceptions of student engagement in units incorporating UDL?

RQ 4: What benefits do teachers see, if any, of using UDL in the classroom?

RQ 5: What barriers do teachers see to implementing UDL in the classroom?

RQ 6: How does UDL training impact teachers' perceptions of students' ability to change factors related to school engagement and academic performance?

RQ7: How does UDL training impact teachers' perceptions of their abilities to meet students' jagged learning profiles?

Study Limitations

One of the most critical aspects of genuinely understanding any educational strategy's impact is seeking student input. UDL creates inclusive and equitable learning environments by seeking student voices to co-create learning tasks that are rigorous, grade-level, and engaging (Meyer et al., 2014; Novak, 2021). This study did not include students' voices. Because of the time of the year, it was not easy to allow time for parents to provide consent for all the students involved. Student voice would be imperative to

moving forward with UDL strategies in any district wanting to implement UDL and for any future study analyzing the effectiveness of UDL on engagement.

It was challenging to measure implementation fidelity to ensure teachers used the best UDL practices. The researcher trusted each teacher to use UDL strategies effectively. While each participant participated in training requirements, teachers chose which options to provide students in their UDL groups. While the researcher did meet with each participant to discuss their plans before implementation, the researcher did not complete observations of classrooms to monitor the introduction and use of strategies.

The research participants included teachers from two intermediate schools, one middle school, and one high school in the participating district. Only nine teachers responded, and eight of those teachers were at the high school level. One teacher was at the middle school level. Therefore, the study focused on secondary teachers and did not encompass lower grades from the intermediate grade levels, fifth and sixth grade. Given the size of the study and the convenience sampling used from the researcher's place of employment, the results of this study validated experiences within the research district specifically, and the results did not apply to other school districts as *generalized* research outcomes. Larger-scaled research studies are necessary to validate any of these findings.

Part of the low teacher participation could be attributed to the time of year in which the study began, nearing the beginning of the 4th quarter, when teachers focus on state testing requirements. Additionally, this study occurred during year three of a national pandemic attributed to Covid-19. These factors might skew student engagement and teacher fidelity of implementation.

Definition of Terms

At-Risk Students: The Glossary of Education Reform (2013), created by the Great Schools Partnership, defines at-risk students as

> students who face circumstances that could jeopardize their ability to complete school, such as homelessness, incarceration, teenage pregnancy, serious health issues, domestic violence, transiency (as in the case of migrant-worker families), or other conditions, or it may refer to learning disabilities, low test scores, disciplinary problems, grade retentions, or other learning-related factors that could adversely affect the educational performance and attainment of some students. (para. 1)

Deficit Thinking - Definition from Hammond (2015): "Deficit thinking defines students and their families by their weaknesses rather than their strengths, suggesting that these weaknesses stem from low intelligence, poor moral character, or inadequate social skills" (p. 33).

Disengaged: Chipchase et al. (2017) suggested that "disengaged students have been described by what they do not do, such as not preparing for class, reading set material, participating in class, completing assignments or taking advantage of learning opportunities" (p. 34). Common terms used for research analysis for this study: boredom, tardiness, frequent absence, discipline problems, low school performance (low grades), cheating, lack of focus, not completing tasks, aggression, frustration, lack of belonging, and absence of effort.

Efficacy: Hattie defined collective teacher efficacy as a group of educators' beliefs regarding their ability to impact student learning and achievement (Meta^{x}, 2021). For this

study, efficacy focused on an individual teacher's mindset about their ability to positively impact student learning and achievement as outlined in *Visible Learning for Teachers* (Hattie, 2012, p. 161). Efficacy can be applied to students in the same way concerning their belief around their ability to succeed in a given learning task.

Engagement: Fredricks et al. (2004) suggested that engagement consists of three strands and must be evaluated using those combined elements. "The fusion of behavior, emotion, and cognition under the idea of engagement is valuable because it may provide a richer characterization of children than is possible in research on single components" (p. 61). Common terms used for research analysis for this study: adherence to classroom rules, interest, happiness, self-regulated, persistent, completes homework, participates in class, seeks help, pays attention, displays effort in learning, motivated, responds to directions, interacts with others.

Jagged Learning Profile: Rose (2016) explained the jagged learning profile in his book, *The End of Average*. Novak (2020) referred to this idea in her book *unlearning*, tying the variability of students' strengths and weaknesses in any classroom on any given moment, topic, and activity to the UDL dimensions around interest, persistence, expression, communication, and executive functions (pp. 8-9).

Marginalized Students: IGI Global (n.d.) defines marginalized students as "Students whose identities cause harassment, are underserved, or are unable to succeed on college campuses. Marginalized students may come from low-income backgrounds, be LGBTQA+, disabled, or racially minoritized" (para. 1). For the study, the researcher recognized that the characteristics defined by IGI were also relevant to K-12 students.

Motivation: Wiesman (2012) defined motivation as the "intrinsic desire to learn" (p 102). Lee and Reeve (2012) further noted that motivation is the process whereby students initiate and persist in classroom activity" (p. 728). For this study, motivation was assessed through student's behavioral engagement in tasks. As Lee and Reeve (2012) suggested, "motivation is the private cause, whereas student engagement is the public effect" (p. 730).

Outcomes: Fisher et al. (2018), in their book *Engagement by Design*, stated that students need clarity around outcomes. "Termed success criteria, desired outcomes are concrete and demonstratable" (p. 79) and include rubrics, checklists, and formative evaluation. For this study, *outcomes* focused on the formative evaluation process that allows students to demonstrate their understanding of content, including the unit summative. The researcher will use the term "unit grades" to signify the scores of students over the span of a unit of study.

Special Education Services: The Department of Elementary and Secondary Education (DESE, n.d.) provides insight into special education services, often referred to as special services: "Within the Division of Learning Services, the Office of Special Education administers state and federal funds to support services for students and adults with disabilities" (para 1)**.**

Standards-Based Grading: According to Marzano (n.d.), standards-based grading can be defined as "a system of assessing and reporting that describes student progress in relation to standards" (p. 1). Some of the grade levels in the participating district use standards-based grading.

Universal Design Learning (UDL): Definition from Center for Applied Special Technology, D/B/A CAST, Inc., (CAST):

> UDL is a framework to guide the design of learning environments that are accessible and challenging for all. Ultimately, the goal of UDL is to support learners to become *expert learners* who are, each in their own way, purposeful and motivated, resourceful, and knowledgeable, and strategic and goal-driven. UDL aims to change the environment's design rather than change the learner**.** When environments are intentionally designed to reduce barriers, all learners can engage in rigorous, meaningful learning. (UDLguidelines.cast.org, para 1).

UDL offers choice in how learners are presented with learning, engage with the learning, and demonstrate understanding of their learning.

Summary

While many factors influence motivation, engagement, and student learning, teachers can significantly impact students' success by removing barriers to learning that are within their control. This study aimed to determine if UDL could empower teachers to increase student engagement and achievement. By building teacher efficacy to engage all learners, UDL could help disengaged learners find success in school.

Chapter Two: Review of Literature

Introduction

Universal Design for Learning (UDL) brings equity to the classroom and reduces barriers to accessing material for any given content. Because UDL increases student agency through choice, while holding students accountable to grade-level standards, it increases rigor and engagement. Antonetti and Stice (2018), Fisher et al. (2018), Hattie (2012), and Willingham (2009) reported that students learn best through choice and right-sized challenges. It makes sense that UDL would engage previously disengaged students and thus increase student scores on assessments. A recent article from Fisher and Frey (2021) listed several barriers that led to disengagement and called upon teachers to "remove barriers that can slow student learning" (p. 77). These barriers were initially categorized by Cerbin and Chew (2020) and are addressed later in this study. Brain-based learning research affirms that for students to engage with the material, the environment must be safe, the learning must be relevant and right-sized, and students must own their learning (Hammond, 2015; Hattie, 2012; Willingham, 2009). UDL can create these learning necessities for students through thoughtful planning and lesson design. Understanding the history of UDL and the basics of the framework. With an understanding of the framework, it is easier to apply UDL principles to enhance the learning of all learners, especially those not using special education services. This review will cover the history and principles of UDL before moving into the research on how students learn, the barriers to learning, and how UDL can help all students.

Progression of UDL

In the early 1980s, UDL bloomed through the creation of CAST, the Center for Applied Specialized Technology, by addressing the use of technology to assist learners with disabilities (Meyer et al., 2014; Thibodeau, 2021). The founders, Rose, Meyer, Meo, Stahl, and Mensing, were convinced that learners could find more ways to access learning through technological enhancements and supports (as cited in CAST, 2022, "Timeline of Innovation" section). As research on the science of learning expanded, the UDL framework acknowledged that schools could significantly reduce barriers to learning for students with various needs through curriculum adjustments (Meyer et al., 2014). The focus of inclusion in the Individuals with Disabilities Education Act pushed for schools and educators to seek out "practical and manageable" options and resources for this subset of students (CAST, 2022, "1990" section).

The UDL framework offers guidelines for providing options in how students engage with a lesson, how the material is presented to students, and how students demonstrate and express their understanding of the content. Three principles of the framework represent these three components: Engagement, Representation, and Action & Expression, which are based on the learning networks within the brain (Meyer et al., 2014). Within each principle are guidelines that support how students access content, build knowledge within that content, and express their learning of the content. These guidelines mimic how the brain encodes new information (Almarode et al., 2021). The guidelines were first made available in 2008 to guide the research and use of UDL in education (CAST, 2022, "Time of Innovation" section). In the same year, UDL was defined in the Higher Education Opportunity Act:

> The term ‘universal design for learning’ means a scientifically valid framework for guiding educational practice that— (A) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and (B) reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient. (Public Law No. 110-315, Sec. 103.24, 2015)

The inclusion of UDL in the Higher Education Opportunity Act could be, in part, why there is a wealth of research on the benefits of UDL in higher education around the world.

UDL continued to expand and refine in response to research on learning. In 2014, Meyer et al. (2014) provided an updated vision for UDL in *Universal Design for Learning: Theory and Practice.* While still including the framework and guidelines to assist schools and educators in choosing best practices to meet the most students, the updated framework also focused on building expert learners. The guidelines encourage responsibility of learning on students by creating and modeling a growth mindset and building student efficacy in choosing the best strategies to meet their learning goals, arguably a skill all students need not only as they progress through their education, but as they meet the demands of college and career. In 2015, UDL was presented and defined as a framework for preparing all students for college and career in the Every Student Succeeds Act (ESSA) (Public Law No. 114-95, 2015). ESSA calls upon schools to support high-risk students by using UDL in technology, state assessments, formative

assessments, and instruction. High-risk or at-risk students "include students of color, first-generation students, low-income students, students with disabilities, and English as a second language learners" (Eitzen et al., 2016, p. 59).

In 2020, CAST announced another revision to the guidelines to expand their use to bring equity to all learners. This movement, titled *UDL Rising to Equity*, hoped to invite the community to build better guidelines that "reach their full aspiration of recognizing and responding to the needs of all learners" (CAST, 2020). An advisory board was created in 2021 for the work around updating the guidelines.

UDL Learning Networks

UDL is rooted in learning science. UDL recognizes the complexity of learning and the many networks in the brain by focusing on the three main networks involved in the learning process. According to Meyer et al. (2014), these networks appear across literature on learning and the brain, including work by Vygotsky and Bloom. These three networks are the affective network, the recognition network, and the strategic network. Even though these three networks work simultaneously during the learning process, UDL separates them to help educators understand how to design lessons to reduce barriers to learning.

The affective network is activated in how learners initially engage with a task or situation, persist in the challenge, and self-regulate throughout the learning process (Meyer et al., 2014). If a task is perceived negatively, the recognition and strategic networks that follow the learning process are impaired (Meyer et al., 2014). The recognition network is mainly responsible for how a learner comprehends letters, symbols, and sounds. This network relies heavily on perception based on experience, past

knowledge, and clarity of the information represented. The strategic network, located in the brain's frontal lobe, initiates a person's movements, goal setting, and adjustments. Three regions compose this network that helps control simple movements to complex, creative expression. (Meyer et al., 2014).

UDL Principles and Guidelines

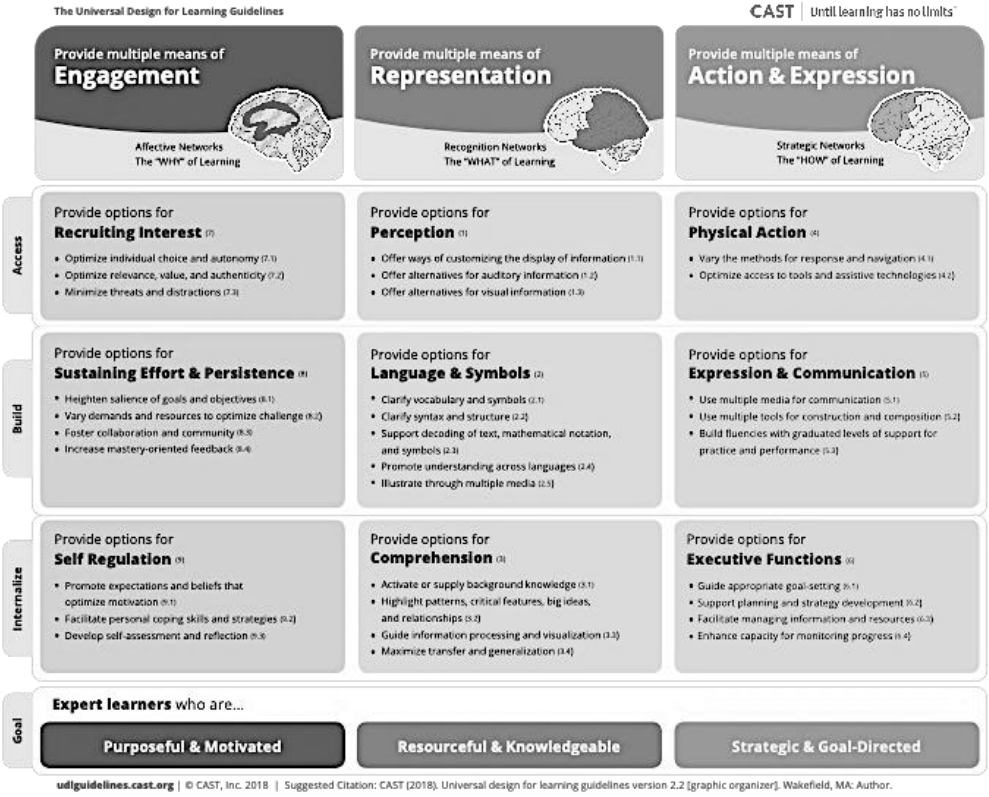
The three principles of UDL developed by CAST correlate with the primary learning networks within the brain responsible for each category. Principle one promotes multiple means of engagement, which correlates with the affective network. Principle two emphasizes various means of representation that correlates to the recognition network. Lastly, principle three focuses on multiple means of action and expression, which correlate to the strategic network.

Within each principle are three guidelines or checkpoints that reference the main goals of UDL. The lowest guideline within each over-arching principle references ways to provide focused, intentional options for students. The middle guideline addresses ways to support and build expert learners. The highest guideline offers ways to develop and prepare for self-directed learners within each category (Meyer et al., 2014). For example, in the UDL Guidelines in Figure 1, The Engagement Principle, has three goals. The bottom goal, "provide options for recruiting interest," references ways to offer focused options that recruit interest in a task (p. 128). The middle guideline, "provide options for sustain effort and persistence," gives examples for supporting students as they work to maintain engagement during times of increased challenge (p. 128). The top guideline, "provide options for self-regulation," offers tips for helping expert learners maintain engagement without support from others (p. 128). The goal of UDL is to use strategies to

support a student-centered learning experience. Meyer et al. (2014) insisted that "a 'successful' or 'rigorous' curriculum provides genuine learning opportunities for all" (p. 128). UDL allows students options to use their strengths in learning grade-level content.

Figure 1

UDL Guidelines (CAST, 2018)



Application of UDL

Eitzen et al. (2016) emphasized that UDL was a viable solution to retaining marginalized students in higher education. Several studies indicated that UDL improved teaching methods and student satisfaction in college. For example, Smith (2012) outlined a study that restructured the design of five university courses to incorporate UDL design principles. The redesign resulted in fewer students requesting accommodations because

those needs had already been addressed. Grimes et al. (2019), Schelly et al. (2011), and Wynants and Dennis (2017) reinforced the success of UDL on student perceptions of their learning after instructors were trained in UDL principles and disability awareness. Grimes et al. (2019) described the difficulties students faced with their disabilities, especially those with mental illness, and the reasons they chose not to disclose in college. Disability awareness and UDL training significantly improved students' experiences in the classroom and boosted instructors' understanding and use of appropriate strategies to mitigate challenges. Thus, it is plausible that UDL can also be a viable solution for teachers and students in grades 5-12, to increase awareness of best practices and student performance.

The success of UDL with K-12 learners who utilize special services is well documented (Johnson-Harris & Mundschenk, 2014; Katz, 2013; Meyer et al., 2014; Posey & Novak, 2020). Kortering et al. (2008) administered a survey in inclusive high school algebra and biology courses. These surveys helped determine if UDL strategies increased the engagement levels of students using special services. Researchers surveyed students (those with and without learning disabilities) after each class. The researchers found that both regular education students and students receiving special services believed the UDL activities were beneficial, indicating they enjoyed them over activities in other classes. This study supported the idea that UDL positively affects motivation and engagement. A similar study by Abell et al. (2011) surveyed 867 students in grades 5-12 in the classes of 15 teachers using UDL principles in their lessons. The high school students in the study claimed to find learning more personalized and participated more than younger students surveyed. The authors indicated these were encouraging outcomes

for the study since high schoolers generally have lower engagement levels than students in younger grades.

Likewise, Katz and Sokal (2016) trained teachers in the three-block method of UDL and then interviewed a random sample of students regarding their perceptions of these teachers' strategies in classes. They found that students had increased knowledge of learning and desired more autonomous student-centered classroom activities, such as they had been engaged in during the study. Katz and Sokal (2016) noted the deficit of research on using UDL for students without disabilities. Despite new research on using UDL as a tool for racial justice and SEL (Bosio, 2020; Chardin & Novak, 2021), using UDL as an exclusive focus for students without disabilities is still underrepresented in current research. To bridge the gap for the present study, the researcher looked for trends in recent research regarding how students learn, common barriers to learning, and how to maximize engagement to see if UDL principles could match these trends or deficiencies. These findings are presented in the following sections.

The Learning Process, Simplified

Hammond (2015) and Willingham (2009) simplified each learner's complex learning process in the classroom. Learners are introduced to a topic that resides in short-term memory. Because learning is both cognitive and emotional, past experiences, perceived safety, relationships, etc., contribute to how learners perceive any given task. If a task is perceived negatively, the recognition and strategic networks that follow the learning process are impaired (Meyer et al., 2014).

Within roughly 20 seconds, the learner decides to proceed or abandon a task (Hammond, 2015). If they proceed, learners begin processing information between

working and long-term memory, where past knowledge is stored. The brain seeks to make connections to past knowledge during this phase. The brain can process information in this way for a limited amount of time, which varies according to age; it maxes out around 20 minutes (Hammond, 2015). New information then must be compressed into chunks. During this processing time, which takes about 10 minutes, no further information can enter the thinking process (Hammond, 2015). For this reason, teachers need to design processing time for reflection in daily learning. Furthermore, as the brain seeks past knowledge to make meaning, clarity of content and task are vital lesson components.

Because working memory is limited, new information must move to long-term memory, or it is lost. The movement of information must occur within two days through practice, review, and application, and these steps should be spaced again to deepen learning (Hammond, 2015; Willingham, 2009). During this phase of learning, teachers release students to begin independent practice. Students are charged with using what UDL recognizes as the strategic network, which involves goal setting and actions to persist in a given task (Meyer et al., 2014). While many barriers can prevent learners from moving smoothly through the learning process, engagement is the biggest categorical obstacle to learning.

Learner Variance and the Role of Engagement

Wiesman (2012) defined motivation as the "intrinsic desire to learn" (p. 102). Lee and Reeve (2012) further noted that "motivation is the process whereby students initiate and persist in classroom activity" (p. 728). They further suggested that "motivation is the private cause, whereas student engagement is the public effect" (Lee & Reeve, 2012, p.

730). The link between motivation and engagement is evident. In their study, Fisher et al. (2018) concluded that "when students are engaged and connect learning with their everyday lives, they are 14 times more likely to be academically motivated" (p. 149). Self-motivation can link to contentment and pleasure in learning tasks (Hattie, 2012). Adelman and Taylor (2017) noted:

> An increased understanding of motivation clarifies how essential it is to avoid processes that limit options, make students feel controlled and coerced, and focus mostly on "remedying" problems. Such practices are seen as likely to produce avoidance reactions in the classroom and to school and thus reduce opportunities for positive learning and for developing positive attitudes. (pp. 5-12)

Yet, Wiesman's (2012) study disclosed that teachers often misalign the strategies that affect student motivation, placing the wrong emphasis on ineffective methods.

When teachers focus on the outward engagement of students, they often lump students into two categories: engaged or disengaged. Engaged students are often described in the research literature as being motivated, putting forth the effort, setting goals, achieving higher grades, being focused, following the rules, and other positive qualities (Aelterman et al., 2019; Bourgeious & Boberg, 2016; Chipchase et al., 2017; Flores, 2019; Guvenc, 2015). The same literature described disengaged students as poorly behaved, helpless, apathetic, bored, frequently absent, not completing homework, resentful, and similar negative qualities. These students might come from low socio-economic status, lack parental support, suffer from undisclosed mental illness, or be marginalized, due to language or diversity barriers. These students fail to engage with content, claiming boredom or anger, and find themselves accumulating missing

assignments and low scores. (Chardin & Novak, 2021; Flores & Brown, 2019; Hanna, 2014; Jensen, 2013) The attributes of disengaged students match the definition of high-risk or at-risk students. The Glossary of Education Reform, created by the Great Schools Partnership, defines at-risk students as:

> students who face circumstances that could jeopardize their ability to complete school, such as homelessness, incarceration, teenage pregnancy, serious health issues, domestic violence, transiency (as in the case of migrant-worker families), or other conditions, or it may refer to learning disabilities, low test scores, disciplinary problems, grade retentions, or other learning-related factors that could adversely affect the educational performance and attainment of some students. (para. 1)

These students are often at the center of the discussions regarding learning gaps. Hammond (2015) argued that while educators often attributed learning gaps to the "cultural poverty" of the students, the reality was that such gaps occurred due to the lack of stimulating content and shallow learning caused by a "pedagogy of poverty" (p. 14). Teachers have the power to close learning gaps by expanding their mindsets. UDL can equip teachers to "eliminate inequities," as Chardin and Novak (2021) explained, because it helps teachers engage all learners by removing learning barriers and creating a curriculum to which learners can relate (p. 66). They encourage teachers to reflect on the following questions:

> Whether intentionally or not, do we expect some of our students to be disruptive?

> Do we plan for them to be disengaged or struggle? Do we assume their background and/or current situation and circumstances will determine who they are, how they will behave, or how they will achieve? (p. 141)

Actions spill from mindsets. *The Opportunity Myth,* published by TNTP (2018), revealed that teachers with low expectations for students presented low-level work for those students, ultimately causing decreased engagement, learning loss, and increased learning gaps. Unfortunately, exclusive mindsets drive students from the classroom.

Furthermore, Flores and Brown (2019) studied high school students who dropped out of regular education classes and enrolled in an alternative high school program. They found that when students tried to reengage with coursework, rigid teachers and policies and dismissive attitudes from teachers and administrators influenced their decision to leave school. Many students were dealing with difficult situations at home and had parents who distrusted the school system. The students at the alternative high school program, including those that ultimately dropped out of school, noted they were more engaged because of the autonomy afforded them through choice and teamwork. While many of these students received one-on-one support, the relationships and guidance of their teachers led them to reengage in school. Flores and Brown discussed the importance of creating better early interventions to assist disengaged learners before dropping out. UDL calls upon teachers to reframe their approach to learners to reduce the effects of assumptions regarding low-performing students, those with and without diagnosed learning disabilities.

Such deficit thinking only further alienates students who are struggling to find success at school. Almarode et al. (2021) stated, “our beliefs and misconceptions about

how students learn can challenge our capacity to create, fashion, and execute great learning by design" (p. 38). Likewise, Chardin and Novak (2020b), in the GBH Education webinar, *Teaching Science Through the Lens of UDL,* noted that educators must stop predicting students' futures with labels (23:25). In other presentations, they emphasized that labeling students leads to "low expectations, remedial learning expectations, and marginalized experiences" (GBH, 2020a, 43:40). Gatlin-Nash et al. (2021) cited several studies demonstrating teachers' perceptions of their students' academic abilities, based on behavior, gender, race, and language abilities.

All students have the potential to learn (Willingham, 2009). Educators can tap into that potential by empowering students through choice in their learning experiences. Chipchase et al. (2017) described disengaged learners as "alienated learners with a loss of autonomy and voice" (p. 35). Their study showed that the three types of engagement also correlated to disengagement; thus, students can be disengaged in one area but engaged in others. The factors that Chipchase et al. (2017) outlined as factors influencing disengagement mesh with the research by Hammond (2015) and Cerbin and Chew (2021) regarding issues that distract from learning. One problem that contributes to disengagement is teaching to the average student.

Additionally, all learners have jagged profiles, which means teaching cannot be geared toward a mythical average student (Posey & Novak, 2020; Rose, 2016). Willingham (2009) argued that assigning the same work to all students is "self-defeating" for teachers (p. 21). Outdated myths about learning can only be tackled by understanding variance. First and foremost, knowledge is malleable (Willingham, 2009; Meyer et al., 2014). Teacher mindset and recognition of this fact are essential in modeling a growth

mindset for students. Furthermore, the idea of a preferred learning modality is inconsistent with the research (Furey, 2020; Hattie, 2012; Meyer et al., 2014; Willingham, 2009).

The American Psychological Association (2019) confirmed the lack of evidence to support set learning styles, stating that teaching in this manner "undermines education" (para. 6). "If our goal is to identify and nurture individual excellence," Rose (2016) explained, "we will only succeed if we pay attention to the distinct jaggedness of every individual" (p. 40). When teachers expected students to adapt to rigid learning environments, they limited students' capabilities and generalized teachers' expectations of students (Meyer et al., 2014). Variance in learners is "largely systematic and predictable" when educators plan for all phases of learning (Meyer et al., 2014, p. 85). The first step is to consider the barriers that prevent students from accessing material, due to their ability or language (Chardin & Novak, 2021). However, that must be expanded; Chardin and Novak (2021) suggested that teachers also consider "barriers related to race, class, gender, religion, and sexual identity" (p. 9). Lesson design then includes how teachers develop the environment and expectations around all aspects of the environment, including class management, collaborative structures, and self-regulation.

Chew and Cerbin (2021) emphasized, "Effective, skilled teaching involves reaching as many of the less knowledgeable, less motivated students as possible, and developing them into well-informed, keen learners of our discipline" (p. 2). If a student does not carry the "inherent desire" to engage in a learning task, then it is up to the teacher to provide motivation through engaging content (Weisman, 2014). UDL builds this engagement through instructional choice (Mrachko & Vostal, 2020). Choice and

multiple means of engagement support increased motivation for students to persevere through classroom work and address the variance within any classroom. Students voiced their desire to learn in various methods in a study by Holquist et al. (2020).

Meyer et al. (2014) shared that UDL, which is all about providing variance in learning, can help "discouraged, unmotivated learners catch fire when given ways to learn that are optimized for their particular strengths and weaknesses" (p. 3). Choice does not mean a lack of intentional design or rigor (Posey & Novak, 2021). Choices are planned around specific learning goals that "adjust demands and provide support as needed to recruit student interest, sustain effort and persistence, and develop the ability to self-regulate" (Meyer et al., 2014, p. 91). In a 2020 survey, students indicated "a lack of choice, an overwhelming amount of busywork, and insufficient accommodation as barriers to engagement" (Holquist et al., p. 7). Effective lesson design helps students find the motivation to engage in tasks. Too many choices can overwhelm some students, so teachers must balance choice with the purpose (Novak, 2022). Since many components can quickly negate motivation and thus decrease engagement in the classroom, teachers can take the first step to motivate students by understanding and planning for the impediments to the learning process.

The Role of Engagement in Learning

Learning begins when students' attention is drawn to a learning task that is both relevant and produces positive emotion (Hammond, 2015). Almarode et al. (2021) emphasized that learning can only progress if learners "have the desire or willingness to commit" to the learning task. Almarode (2014) and Fredericks et al. (2004) explained that

three types of engagement are variable from learner to learner and task to task. All three forms of engagement must be present for optimal student learning.

Behavioral engagement is observable and is the focus of most teachers when describing engagement. Students are behaviorally engaged when attending to classroom norms, completing tasks, showing up to class, etc. (Fisher et al., 2018). However, a student can be behaviorally engaged and lack other forms of engagement (Almarode et al., 2021). If a student is cognitively disengaged, behavioral disengagement and disruptions are likely (Aelterman, 2019; Almarode, 2014). In their review of engagement literature, Fredericks et al. (2004) found a correlation between engagement and discipline issues; as engagement increased, discipline decreased. Not surprisingly, when students with behavior disorders were given a choice in how to interact with classroom content, Johnson-Harris and Mundschenk (2014) found those students' engagement and academic achievement improved, noting that UDL provided "built-in behavior supports" (p. 169).

Current researchers argue that emotional engagement describes students' interests and feelings about a particular task, school in general, or their sense of belonging (Almarode et al., 2021; Fredericks et al., 2004). Almarode et al. (2021) insisted in their work *How Learning Works* that students must be emotionally connected to a task to drive cognitive engagement. Teachers can build emotional engagement through the relevance of tasks, strong student-teacher relationships, and novelty (Almarode, 2014).

Cognitive engagement is the most elusive form of engagement to track because it revolves around what students think. Almarode (2014) explained that "cognitive engagement is exemplified by strategic strategies that explicitly require students to think about ideas, topics, concepts, and content" (p. 28). Students are cognitively engaged

when they create their own meaning “rather than accept another’s thinking” (Antonetti & Stice, 2018, p. 66). Teachers can understand students’ cognitive engagement through non-obtrusive assessments and student metacognitive strategies.

Interestingly, students in a study by Holquist et al. (2020) added a view of entirely social engagement, describing the ability to feel comfortable talking to peers and the teacher when needed. Students noted that providing collaborative processing and options for group and peer work was a strategy that improved their engagement and made learning more enjoyable. A few disengaged students indicated that the social aspect of the class allowed chances for their peers to motivate them to stay on task and complete work.

Many factors influence any given learner's engagement at any time. While cognitive engagement is highly influenced by emotional engagement, cognitive engagement can mask behavioral engagement; therefore, removing barriers to learning is essential. Hattie’s (2012) synthesis of work by Angus et al. (2009) noted that “uncooperative (students) had the lowest achievement gains over the year, but their gains were not so different from those of the disengaged” (p. 112). According to the research, disengaged students who appear to lack motivation might feel overwhelmed by the magnitude of the task of trying to catch up to their peers (Hammond, 2015). The researchers suggested that students have perceptions of what makes a task unengaging. That list included lacking instructional variety, lacking student choice, assigning busy work, teaching to a test, not providing relevance to a task, displaying negative attitudes or lacking teacher support, and work that students can easily look up on the Internet rather than thinking critically (Holquist, 2020; Quaglia Institute, 2018).

Learning Barriers

What barriers to learning are most prevalent if removing barriers can increase engagement? How can UDL address these barriers and thus potentially increase engagement and, ultimately, student achievement? Chew and Cerbin (2020), Chardin and Novak (2021), Hattie (2012), and Meyer et al. (2014) all addressed barriers to learning in the classroom, which are presented below.

Teacher Mindset and Expectations

Hattie (2012) declared that "teachers' beliefs and commitments are the greatest influence on student achievement over which we have control" (p. 22). A study by Bourgeois and Boberg (2016) found that collective teacher efficacy was positively correlated to student emotional engagement. Further, Vermote et al. (2020) noted that teachers' perception of students' ability to learn influenced the strategies they employed in the classroom, significantly impacting student engagement and achievement. According to Vermote et al. (2020), teachers can promote motivation and engagement by being "supportive rather than undermining of students' psychological needs for autonomy, competency, and relatedness" (p. 270). Each of these needs is addressed through UDL.

Teachers' mindset about learning can affect the value teachers place on relationships, the attitude they project toward disengaged students, and the level of support they offer to all students. In a study by Al-Fadhili and Singh (2006), they noted that students would inherently adopt a self-expectancy that matched the teacher's expectations. A study by Shernoff et al. (2017) of seven high schools across six disciplines found that open and collaborative classrooms promoted student engagement.

When students felt they were seen and the teacher cared about their success, they viewed the class positively and were likelier to engage in the learning tasks. Unfortunately, teachers with fixed mindsets were often rigid and controlling in their strategies and responses to students, often dismissing students who began to fall behind or needed more support to flourish autonomously (Guvenc, 2015; Reeve, 2009; Soenens et al., 2012; Vermote et al., 2017). All these issues led to student disengagement.

A survey of disengaged and engaged students by Holquist et al. (2020) supported these studies. Students indicated that not only did teachers have the most significant impact on their learning, but that a teacher's lack of effort in class, inability to show enthusiasm for the content, and lack of support for student needs thwarted student engagement. Cerbin and Chew (2021) reported that student mindset "encompasses the teacher, course, topic, pedagogy, method of assessment, and beliefs about their likelihood of success" (p. 5). The relationship between student and teacher determines if students learn (Willingham, 2009). Teachers should create learning environments that consider students' variance in experience and interest and promote autonomy in tasks (Fredericks et al., 2004; Reeve et al., 2004; Shernoff et al., 2017; Vermote et al., 2020). Posak and Novak (2021) revealed that teacher expectation is often the most significant barrier in the classroom. According to Hattie (2011) and Willingham (2009), students are attuned to what teachers value based on the level of expectation in assigned tasks.

Student success increases when teachers believe they can meet the needs of every student (Novak, 2022). The goal of UDL is to provide high expectations for all learners in ways that allow each learner to find success in meeting the learning targets. Teachers

who understand learner variance and the barriers to learning and believe they can help those students succeed will have successful students.

Cognitive Load and Working Memory

Human beings are naturally curious, but learning requires the right environment (Willingham, 2009). Willingham (2009) noted that students would be motivated to engage in the task that is at the appropriate level—not too easy nor too difficult. Hattie (2012) stated that the goal should "be seen as unattainable, given the student's level of prior achievement, self-efficacy, or confidence" (p. 51). Many issues affect how students view any given task as being attainable or not, such as the complexity of the task, experience with a task, background knowledge, clarity of a task, and the impediments of working memory.

Clarity around learning tasks gives both instructors and students a clear goal to achieve by the end of the lesson. When instructors take time to present clear, intentionally organized lessons and expectations, students are willing to engage in learning (Frey et al., 2018). Providing clarity through task design requires instructors to acknowledge that there will be students with prior knowledge or procedural gaps and to provide support for those gaps through multiple means of engagement, representation, and action/expression. The human brain cannot focus on incoming information when the outside world competes for students' attention (Chew, 2021). If clarity is not provided, students waste valuable brain focus on deciphering the meaning of the task or staring out the window instead of thinking about the steps and knowledge needed to complete the task.

Another barrier to learning is background knowledge. Critical thinking cannot occur without sufficient background knowledge (Cerbin & Chew, 2020; Willingham,

2009). A lack of background knowledge is the core of learning gaps, because the more background knowledge a student has, which has worked its way into long-term memory, the more room that student has to retain new information. Thus, if a student already has a deficit, working to bridge that gap, let alone upcoming gaps, makes it more challenging to catch up to their peers. UDL suggests teachers provide a variety of supports to help build background knowledge, which students who recognize (or are directed to) those supports can utilize. Meyer et al. (2014) emphasized that these multiple forms of representation are "not an issue of perception but decoding" (p. 121). If these supports are provided with the intent to build autonomy in learners, students will be more motivated to engage in those tasks (Reeve et al., 2004). By providing clarity and background knowledge, teachers can free up space in students' working memory.

Working memory is limited in the amount of information it can process. Students' working memory is impacted by the level of the task being assigned and each student's efficacy in the content and specific skill being assessed (Almarode et al., 2021). However, other distractions or "incidental demands" that compete for attention can impede learning (Meyer et al., 2014). Thus, if student tasks include irrelevant information or support is not provided to encourage students to persist with the steps within the task, engagement can either be focused on the wrong content or thwarted entirely. Hattie (2012) found that "teachers more often see challenge in the activity itself—that is the task—students see challenge in the difficulty of completing the task" (p. 51). When students try to "encode" or connect past learning to new learning, they "require multiple representations of the content, skills, and understanding" (Almarode et al., 2021, p. 68). Whether the task is seen as too easy and a waste of time or too

challenging to tackle, students on both sides of the spectrum often end up zoning out or not completing tasks. UDL can reach these learners by considering this variability in the design of the lesson and creating options for students who might need more challenge or support through multiple representations and support structures. These structures, coupled with teacher feedback, help students become aware of successful tactics when facing similar learning challenges (Posey & Novak, 2021; Willingham, 2009). Ultimately, UDL aims to help students become expert learners who can self-regulate and adjust their learning strategies to reach a goal.

Student Self-Efficacy

Chew and Cerbin (2020) indicated that a mental mindset is a "crucial factor in promoting student engagement and perseverance" (p. 5). Abell et al. (2011) correlated the decreasing self-concept students faced as they progressed in school to the decreased amount of "interest, choice, and enjoyment" they felt in school (p. 173). Students must experience success to build confidence and persistence to complete more complicated tasks. According to Hammond (2015), teachers could build students' efficacy by offering students chances to be successful through "small, incremental success" because the brain will seek that pattern of problem-solving in the future (p. 115). Students indicated in the Holquist et al. (2020) study that they wanted to feel the accomplishment of solving a problem or understanding a complex concept, particularly if it was related to something they knew they would use in the future.

Chew (2021) explained the areas that cause students the most problems in learning and studying. Three areas relate to the concept of self-regulation as an expert learner. Inaccurate self-assessment, inability to focus, and ineffective study strategies

relate to how students guide their learning, reflection, and readjustment. When teachers design lessons with variability, these scaffolds are part of the UDL process. By offering resources for building background knowledge, collaborative structures, modeling effective strategies, clear goal-setting and reflection of goals, and explicit feedback, teachers can help break down these barriers and build the skills learners will need beyond secondary school.

Frey et al. (2018) showed that "persistence and feedback go hand in hand" in various grade levels in which teacher feedback was tied to student success (p. 89). Students recognized feedback only if it was feed-forward feedback that guided future steps toward success (Hattie, 2012). UDL relies on scaffolded structures and feedback to build students' efficacy as expert learners. Meyer et al. (2014) defined an expert learner as "someone who is continually growing and developing through introspection and guided feedback from other experts and peers" (p. 26). They also noted that to create and support expert learners, teachers also must be expert learners.

According to Hattie (2012), lecturing increased as grade level increased, and classrooms with the most teacher talk had the lowest student engagement. Yet, autonomy-supportive structures in the classroom benefit at-risk students (Hattie, 2012). "Teacher-directed work often lacks relevance to all students generally designed to be one size fits all and is often framed by the dominant culture and curriculum" (Novak & Chardin, 2021, p. 57). Building a student-focused style that helps students "develop their inner motivation resources" is the goal of successful autonomy-supportive teaching (Reeve, 2012, p. 167). Teachers can accomplish this task by embedding metacognitive elements into their assignments.

Cerbin and Chew (2020) recommended that teachers provide reflective assignments directly related to students' goals which they track themselves. A study of 20 teachers from two high schools in the Midwest found that the more autonomy-supportive structures teachers used during instruction, the more engaged their students were (Reeve et al., 2004). Reeve (2012) synthesized the literature on such structures and found that students of autonomy-supportive teachers "displayed markedly more positive classroom functioning and educational outcomes than do students of controlling teachers" (p. 159). He explained further that when these structures were not feasible for the lesson, offering relevance for the assigned task was warranted. Shernoff et al. (2017) included student autonomy in their list of motivational supports for students, stating that such a classroom is "responsive to students' background and interests, and provides the autonomy necessary for students to express themselves and feel competent" (p. 203). Similarly, Gorad and See (2011) discovered that students preferred learning that allowed social interaction through group work, supported respectful exchanges with teachers, presented lessons in various ways, and offered support.

UDL seeks to create expert learners who are motivated, resourceful, and goal-directed to thrive in a college or career environment where learners must be ready to learn new things. Katz and Sokal (2016) found that UDL positively affected learners' academic self-concept. Kortering et al. (2008) discovered that UDL ultimately increased motivation and engagement in students with and without disabilities. Engagement is the first step in learning; sustained engagement can offer success to students who might usually struggle with some aspects of learning through multiple access points.

Stress

While stress is not a component of this study, it would be negligent to avoid discussing the research on Pandemic stress. While learning gaps concern educational leaders and teachers, many district leaders cited the mental health of students and teachers as a top concern just above engagement for the 2021-2022 school year, according to the American School District Panel survey (Diliberti & Schwartz, 2021). In the same survey, leaders indicated that students of color and students from poverty had higher absentee rates. Student behavior was the number one cause of stress and low morale indicated by teachers in the MSTA (2021) survey. Student motivation came in second on the MSTA (2021) survey**.** In a thoughtful reflection on the school year, Jessica Kirkland (2022) indicated that students were more engaged with their phones than before and described an awkward emotional disconnect that students have from learning, teachers, and peers. Teachers who pride themselves on deep connections with students and solid teaching techniques were forced to find new ways to reach students. Kirkland (2022) aptly suggested:

> Having the ability to roam their space freely, account for their own time, make a meal while listening to their teacher give a lesson, and not feel pressured to look a certain way to show up for others are many of the perks that adults whose jobs pivoted to work-from-home also enjoy. Returning to a school environment devoid of that autonomy isn't an easy ask. (para. 31)

Kirkland's point prompts further questioning into how teachers can increase engagement through autonomy in their lesson design. UDL encourages autonomy and self-regulation through choice in how students interact with content and demonstrate their understanding.

Bosio (2020) demonstrated how using UDL promotes SEL support, citing that learning is emotional and social. She broke down the SEL competencies and showed how UDL supports each. While UDL is not a silver bullet to the heavy burden of the pandemic, it might be a starting place to build teacher and student efficacy through successful experiences. Teachers can perhaps bridge the gap in motivation by providing autonomy, voice, high standards, student regulation practices, and offer alternative pathways to potentially negative behaviors.

Summary

After their study, Abell et al. (2008) concluded that UDL could be a viable solution to improved engagement. UDL has the potential to address the equity issues many marginalized students face by providing embedded support to remove common barriers to learning. By offering high expectations for all students, but choice in meeting goals, students can access the curriculum and find relevance and motivation to succeed through increased autonomy. UDL has the power to build trustful and safe learning environments. Teachers can use UDL to offer students multiple pathways to understanding rigorous standards and increase student confidence and engagement, ultimately leading to better student outcomes.

Chapter Three: Research Method and Design

A gap in the literature on Universal Design for Learning (UDL) as a strategy to increase engagement, particularly in students without diagnosed learning disabilities, provided urgency for this study, given the increasing challenges of engagement and achievement educators experienced in the Pandemic era. A mixed-methods approach provided triangulation of the data to determine if UDL benefited all students in the classroom. The research results informed the use of UDL in the cooperating district. According to the premise of Fraenkel et al. (2012), the researcher used triangulation to strengthen the findings of multiple methods instead of relying on one singular research method.

Problem and Purpose Overview

A study by Kortering et al. (2008) found that students had increased learning knowledge and desired more autonomous student-centered classroom activities, such as engaging in classes using UDL principles. Katz and Sokal (2016) noted the deficit of research on using UDL for students without disabilities. Despite new research on using UDL as a tool for racial justice and SEL (Bosio, 2020; Chardin & Novak, 2021), using UDL as an exclusive focus for students without disabilities is still underrepresented in current research. To bridge the gap for the present study, the researcher looked for trends in recent research regarding how students learn, common barriers to learning, and how to maximize engagement to see if UDL principles could match these trends or deficiencies. The researcher's primary purpose of this mixed-method study was to investigate if teachers who applied Universal Design for Learning (UDL) to a unit of study noted increased engagement in students overall and also in teacher-identified students

considered “disengaged” compared to students in the same unit of study without the UDL methods applied. Additionally, the researcher sought to determine if students in a UDL course had more significant achievement than students in the same unit of study without the UDL framework applied. Primarily, the researcher aimed to ascertain if UDL would benefit the participating district's students, particularly those not utilizing special services.

Null Hypotheses

The researcher expected to validate UDL as a teaching framework and planning strategy to increase student achievement in students not identified through special services through the following Null Hypotheses:

***Null H_{01}*:** There is no difference in increases in unit grades of students who participate in UDL than students who do not participate in UDL.

***Null H_{02}*:** There is no difference in increases in unit grades of students whom teachers identified as disengaged who participate in UDL than those who do not participate in UDL.

Research Questions

The researcher sought to determine if UDL positively impacted student learning through teachers’ perceptions of engagement between students who used UDL strategies and those who participated in classes without UDL strategies. The researcher also sought to determine if UDL training impacted teachers’ perceptions of student learning and teachers’ efficacy in teaching all students.

RQ1: What characteristics do teachers use to identify students as engaged or disengaged?

RQ2: What are teachers' perceptions of engagement in students previously noted as disengaged in classes incorporating UDL?

RQ 3: What are teachers' perceptions of student engagement in units incorporating UDL?

RQ 4: What benefits do teachers see, if any, of using UDL in the classroom?

RQ 5: What barriers do teachers see to implementing UDL in the classroom?

RQ 6: How does UDL training impact teachers' perceptions of students' ability to change factors related to school engagement and academic performance?

RQ7: How does UDL training impact teachers' perceptions of their abilities to meet students' jagged learning profiles?

Methods

For the qualitative portion of the study, the researcher analyzed the themes emerging from pre- and post-surveys given to teachers regarding qualities of disengagement (RQ1) to determine if the trends matched those from recent literature on the topic. These qualities are presented in Chapter Four. Then following the qualitative research design suggested by Maxwell (2012), the researcher looked for emerging themes from surveys and interviews for comparison and reinforcement of pre-determined themes coded from existing literature.

Surveys

The surveys were adapted from the *Panorama Teacher and Staff Survey*, created by Dr. Hunter Gehlbach through Panorama Education. The survey was a free, open-sourced survey (see Appendix F). The pre-survey addressed RQ1, the characteristics teachers perceive in engaged and disengaged students (see Appendix B). The pre- and

post-unit surveys also addressed teachers' perceptions of students' ability to change factors influencing learning and engagement and teachers' perceptions of their abilities to deal with jagged learning profiles (RQ 6 & 7). The researcher followed Maxwell's (2012) design recommendations, using triangulation and "quasi-statistics" to analyze the results of the surveys.

Interviews

The researcher held an in-person interview (see Appendix D) with each participating teacher after their unit and after the post-unit survey; these interviews were recorded and transcribed. The interview identified the UDL strategies teachers chose, teachers' perceptions of student engagement and academic achievement in both the UDL and non-UDL courses, as well as potential benefits and barriers to using UDL in the classroom (RQ 2-5). Fraenkel et al. (2012) explained that "structured and semi-structured interviews are verbal questionnaires. Rather formal, they consist of questions designed to elicit specific answers from respondents. Often, structured and semi-structured questions are used to obtain information that can later be compared and contrasted" (p. 451). The researcher analyzed the interview narratives to look for what Maxwell (2012) termed "contiguity-based relations," that may or may not reveal conceptual relationships not previously identified (p. 106). The researcher then coded responses to look for connections and emerging themes.

Student Scores

For the quantitative portion of this study, the researcher analyzed unit grades (curricular unit final) between those students who received UDL enhanced lessons and those who did not, using random stratified sampling to address NH1. The teachers

provided student scores, IEP status, and perception of student engagement upon the study's conclusion using a spreadsheet provided by the researcher (see Appendix E). The spreadsheet contained no identifying student data, and teachers sent completed sheets to the researcher at the unit's close. The researcher conducted a preliminary *F*-test to determine if variances were equal. Then the researcher conducted a Two-Sample *T*-test Assuming Equal Variances to see if the scores of students who participated in UDL significantly differed from those who did not participate in UDL.

To answer NH2, regarding comparing scores in students previously identified as disengaged, final unit grades for this group of students were analyzed using the spreadsheet the teachers provided. The researcher used Analysis of Variance, ANOVA, to determine if scores significantly differed between the UDL and non-UDL groups for both engaged and disengaged students.

UDL Training for Teachers

Based on the research of Courey et al. (2012), Lombardi et al. (2015), Schelly et al. (2014), and Wynants and Dennis (2017), teachers participated in UDL training before teachers choosing their classes and units of study. For the teachers participating in the study, UDL training involved a district-created course available to all teachers in the district through the district's learning management system. The courses provided teachers with information through videos, articles, and lectures. Participants applied concepts, reflected on their teaching and ideas about student learning, and evaluated and improved lesson scenarios by refining those lessons with UDL concepts and strategies. Before the training, teachers answered a set of questions via survey to ascertain their perceptions of characteristics students could change in their learning and a set of questions to determine

the teachers' view of their abilities to teach students with jagged learning profiles. These questions were in Likert Scale format. After the training, the researcher shared a digital resource folder with each participant. The resources outlined strategies and tips for implementing UDL in the classroom. Teachers applied the concepts from training in their course for the study. After the unit of study was completed, the researcher gave teachers the same Likert Scale questions to determine if their perceptions had changed. The researcher then analyzed responses for growth in teacher efficacy and compared the results to the transcripts from interviews to look for correlations and themes.

UDL and Non-UDL Courses

Teachers determined which two classes they would like to include in the study, relying on their professional expertise to use the class they felt needed the most support. Teachers identified this class as Group A, the UDL-enhanced course. After participants completed UDL training and the first survey, the researcher sent each participant a digital tracking sheet to record student scores, engagement status, and IEP status for two classes of the same content. No student-identifying data was recorded. Teachers were asked to choose an upcoming unit. Teachers taught the unit as planned in one class (Course B). For the other class (Course A), teachers chose a variety of UDL strategies to meet the variety of needs of their students by providing multiple means of engagement, multiple means of representation, and multiple means of expression. Many of the strategies were outlined in the training and resource packet.

Location and Participants

The researcher sent the recruiting survey to upper elementary and secondary buildings in a district in southwest Missouri: two intermediate buildings housing fifth and

sixth grade, one middle school building housing seventh and eighth grade, and one high school housing grades nine through twelve. Nine teachers responded to the survey, indicating their willingness to participate. One teacher taught at the middle school, and eight teachers taught at the high school. The participants included two science teachers, two math teachers, one foreign language teacher, one Family and Child Science (FACS) teacher, and three English teachers. Most teachers had twelve or more years of teaching experience. Two teachers had one to six years of experience, one teacher had six to eleven years of experience, and six teachers had twelve or more years of experience. All teachers were female.

School Population

The high school instructional coach provided school data from Tyler SISK-12, the district's student information system. The high school had a graduation rate of 98% in the 2020-2021 school year. Thirty-six percent of middle school students had free and reduced lunch, and the high school had 27% of students with free and reduced lunch. The teacher population was predominately white. The ethnic representation of the two participating schools is shown in Table 1.

Table 1

Percent of Ethnicity Representation in Schools Included in Study Sample

School	Total Enrollment	% American Indian	% Asian	% Black	% Hispanic	% Multi-Racial	% White
Middle School	800.00	0.9	0.4	2.3	7.5	3.9	86.8
High School	1247.00	0.9	1.2	3.0	5.7	2.5	85.1

No identifying data was collected from teachers regarding the study's student population; those students' ethnicity are unknown. Fifty-one students from the middle school and 270 students from the high school participated in the study. One hundred and eleven students in the high school had IEPs, and eighty students in middle school had IEPs. The middle school study population was roughly 6% of the total student population, and of that 6% included in the study, 4% had an IEP and were thus not included in the data. The study sample for the high school was 21% of the total student population. Of that 21% in the study sample, 6% of students had an IEP and were not included in the data. Table 2 shows the breakdown of each teacher's class represented in the study. This data was collected from the tracking sheets the researcher provided each teacher.

The total number of students in middle school and high school without IEPs was 1,856 students. The final data analysis included two hundred ninety-nine students without IEPs, accounting for 16% of the total student population of students without IEPs in middle and high school combined.

Table 2

Study Sample Breakdown

Teacher	Class A UDL (number of students)	Number of Disengaged Students w/o IEPs	Total Number of Students with IEPs	Class B Non-UDL (number of students)	Number of Disengaged Students w/o IEPs	Number of Students with IEPs
Teacher A (MS)	27	5	2	23	1	0
Teacher B (HS)	20	6	5	16	6	5
Teacher C (HS)	12	4	0	15	2	2
Teacher D (HS)	12	1	0	19	2	0
Teacher E (HS)	19	7	0	22	4	0
Teacher F (HS)	19	5	0	24	5	0
Teacher G (HS)	23	8	0	18	6	1
Teacher H (HS)	13	5	1	15	5	2
Teacher I (HS)	15	10	1	7	6	1

Threats to Validity

Any study can present several potential validity threats. Identifying and reducing these threats might not "guarantee validity" but can "increase credibility," according to Maxwell (2013) (p. 124). This study had several potential validity threats which are outlined below. The researcher had control over some of the issues and attempted to mitigate those issues to increase the stability of the study.

Maxwell (2013) explained that reactivity becomes an issue when researchers are part of the environment they are studying and have relationships with the participants. The researcher was employed in the district where the study took place but was not in a position of authority. Further, the researcher's bias, including past experiences and knowledge, cannot wholly be separated from the study. The researcher took steps to ensure that the data was accurate and free of bias. The results of the study will be shared with the participating district. The researcher followed Maxwell's design recommendations, using transcripts, triangulation, and "quasi-statistics" to reduce issues of bias and reflexivity (pp. 125-127).

Additionally, the study's time period might impact the study's results. The study took place during the third year of a national pandemic, during the beginning of the last semester of the 2021-2022 school year. As referenced in Chapter One, engagement dropped during the pandemic, impacting student achievement and teacher stress. Student absences were related to the late time period and the pandemic, which some teachers referenced in their interviews. While these issues were beyond the researcher's control, triangulation of data and transcripts allowed for greater depth of analysis to work within the constraints of the time of year.

It was impossible to ensure the fidelity with which each teacher used UDL strategies effectively. Though each participant was required to participate in UDL training, teachers could choose which options to provide students in their UDL groups. The researcher did meet with each participant to discuss their plans before implementation. However, the researcher did not complete observations of classrooms to

monitor the introduction and use of strategies. The researcher used interviews and survey questions to triangulate data regarding effective strategies and outcomes.

Summary

Teachers implemented UDL in nine classrooms at the secondary level in a Southwestern School District in Missouri. The researcher asked teachers to use UDL strategies in one class but to teach as planned in another class of the same content to analyze if UDL might benefit disengaged learners in the district. The researcher used a mixed-methods approach to analyze scores, teachers' perceptions of student engagement, and teachers' perceptions of the efficacy of UDL. The next chapter explains the results of this study.

Chapter Four: Analysis

Introduction

The researcher sought to understand the impact of UDL on student achievement and engagement. The researcher created a survey that included questions from the *Panorama Teacher Survey,* an open-source survey from Panorama Education. Teachers received survey links through *Qualtrics*. The researcher created a student data tracking sheet for teachers to use during their units to track student grades pre- and post-unit. The tracking sheet also identified disengaged students and students with IEPs. Students with IEPs were removed from the data. This tracking sheet was coded and did not include student-identifying data. The qualitative portion of the study included information from the survey and interviews between the researcher and the participating teacher.

Hypotheses

Two hypotheses focused on the differences in scores between the students in the UDL group and the non-UDL group. One hypothesis dealt with the differences between engaged students in these two groups. The other hypothesis focused on the differences between disengaged students in these two groups.

The researcher formed four sets of data from the teachers' tracking sheets: Disengaged UDL Courses, Disengaged Non-UDL Courses, Engaged UDL Courses, and Engaged Non-UDL Courses. These four groups were populated from the teachers' tracking sheets for Class A, and Class B. Students with IEPs were marked with a Yes/No option from the dropdown menu within each class on the spreadsheet the researcher supplied to participants. The scores of these students were not included in any of the four groups.

Likewise, teachers marked if a particular student was disengaged in a yes/no dropdown menu for each class within the spreadsheet the researcher provided them. These scores populated the Disengaged UDL and Disengaged Non-UDL scores. The remaining scores populated the Engaged UDL and Engaged Non-UDL lists. The researcher used an online generator from Fury's (n.d.) Calculator Soup for random sampling to pull paired student scores from the four groups to address both Null Hypothesis 1 and Null Hypothesis 2.

Null Hypothesis 1 Results

***Null H_{01}*:** There is no difference in unit grade increases of students who participate in UDL than students who do not participate in UDL.

The researcher conducted a preliminary *F*-test which denoted variance were equal. Therefore, a Two-Sample *T*-test Assuming Equal Variances was conducted to see if students who participated in UDL were significantly different from students who did not participate in UDL. The analysis revealed that scores of the students who participated in UDL (M = 0.780, SD = 0.21) were not significantly higher than those of the non-UDL students (M = 0.75, SD = 0.21); $t(198) = 0.78$, $p = 0.22$. The researcher failed to reject the null hypothesis and concluded that there is no difference between students' increase in unit grades who participate in UDL than students who do not participate in UDL

Null Hypothesis 2 Results

***Null H_{02}*:** There is no difference in unit grade increases of students whom teachers identified as disengaged or engaged who participate in UDL than those who do not participate in UDL.

The researcher conducted an Analysis of Variance (ANOVA) to determine whether the paired pre- and post-unit scores were significantly different between the UDL and Non-UDL groups for engaged and disengaged students. The analysis revealed that the means of the groups were equal at $P \leq .05$. The ANOVA results are displayed in Table 3.

Table 3

ANOVA Table Comparing Pre- and Post-Unit Grades of Students

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.26	2	0.13	3.15	0.053	3.22
Within Groups	1.74	42	0.04			
Total	2.00	44				

Note: Null Hypothesis 1 and 2; Groups: Engaged and Disengaged in UDL and Non-UDL

Because the means of the groups were greater than .05, but very close to the threshold, the researcher conducted a post hoc Scheffé test. Post hoc analyses using the Scheffé post hoc criterion for significance indicated no significant difference between groups. Results are displayed in Table 4.

Table 4

Post Hoc Scheffé Test Comparing Pre- and Post-Unit Grades of Students

Groups	Fs	Fcrit	Sig?
Group 1 vs. Group 4	2.47	6.44	No
Group 2 vs. Group 3	3.68	6.44	No
Group 2 vs. Group 4	3.55	6.44	No
Group 3 vs. Group 4	0.00	6.44	No

Note: Group 1: Disengaged UDL, Group 2: Disengaged Non-UDL, Group 3: Engaged UDL, Group 4: Disengaged Non-UDL

The researcher failed to reject the null hypothesis and concluded that the final grades showed no difference in grade increases between students whom teachers identified as disengaged or engaged who participate in UDL than those who do not participate in UDL. Thus, UDL strategies did not demonstrate a significant difference in students' scores in this study.

In the interview, five of the nine teachers stated that students in the UDL class were similarly engaged as students in the non-UDL class. It is essential to note that three of the five teachers intentionally chose lower achieving classes with a higher number of struggling learners as their UDL courses. If there was similar engagement from struggling students, the lack of significant difference could be positive if the struggling classes kept up with the non-struggling courses. However, because differences in scores between these groups were not tracked outside of the study unit, this theory would need to be tested over time.

Furthermore, several additional influences might have contributed to the lack of difference in achievement between the UDL and non-UDL classes for both engaged and disengaged learners. Teacher D and Teacher E referenced student absences related to the time of year and school events as an issue. Two teachers specifically offered feedback that the study had "bad timing." Given the lateness of the year, Teacher E lamented, "The kids that are disengaged, it's the end of the year, and they don't want to try something new." Other teachers referenced students who were not participating despite UDL intervention, which would impact scores. Related to the timing of the study, which took place in the fourth quarter, most participants had state testing on the horizon, and

they were limited in the units they could choose. Units varied in length and depth, which could impact the overall growth seen when comparing classes.

Research Questions

The researcher used seven questions to determine teachers' perceptions regarding many aspects of student learning, including the characteristics of students those teachers used to identify if students were engaged or disengaged. Further, the analysis of these questions helped determine the impact of training on teacher perceptions of student learning and teacher self-efficacy, as well as the benefits and potential barriers to implementing UDL in the district. The survey questions came from the open-source *Panorama Teacher Survey*.

Research Question 1 Results

RQ1- What characteristics do teachers use to identify students as engaged or disengaged?

Research Question 1 data were collected from Survey Questions 5 and 6 within a *Qualtrics* survey. The researcher pulled terms used in previous studies regarding engagement and compared those to teachers' responses when asked to identify the characteristics of disengaged and engaged students. Figure 2 shows the descriptors categorized in the literature and participants' corresponding mentions of these terms.

Figure 2

Characteristics of Engaged and Disengaged Learners

Characteristics of Engagement in Research Literature[1]	Characteristics of Engagement Noted by Participants	Characteristics of Disengagement in Research Literature[2]	Characteristics of Disengagement Noted by Participants
Adhere to Rules	Active	Bored	Avoidance
Interest	Answering Questions	Sad	Refusal
Happiness/ Enthusiasm	Participating	Anxious	Not Talking/ Silence
Motivation	On Task	Tardy	Sleeping
Preference for Challenge	Collaborating	Absent/ Skipping	Off Task
Self-Regulation	Discussing	Poorly Behaved	Working on Other Things
Effort	Helping Others	Discipline Problems	Playing Games
Persistent	Asking for Help	Low Grades	Chatting off Topic
Completing Homework	Making Eye Contact	Talking	Blank Stare
Participation	Questioning	Cheating	Heavy Feeling
Goal-Directed	Productive Struggle	Fighting/ Aggression	Negative Body Language
Seek Help		Frustrated	Not Turning in Work
Attention		Lack of Belonging	
Focused/ Intense		Lack of Focus	
Effective Learning Behaviors		Not Completing Work	
Higher Grades		Helpless	
		Disaffected	
		Detached/Indifferent	
		Resentful	
		Unaware	
		Alienated	

Note: Literature terms for Engaged and Disengaged Students were pulled from Alterman et al., 2019; Bourgeiois and Boberg, 2016; Chipchase et al., 2017; Flores, 2019; Fredricks, 2004; Guvenc, 2015; and Reece et al., 2004.

The researcher compared these terms to ensure that the participating teachers held a similar viewpoint as that presented in the literature. The participants' responses aligned with the research on engagement and disengagement characteristics. Three main themes emerged: Behavioral Compliance, Teacher Mindset, and Self-Efficacy. Students who were described with qualities of engagement demonstrated compliant behaviors, such as following rules, turning in work, participating in class, and making eye contact. On the opposing side of the continuum, students who were described with qualities of disengagement lacked compliant behaviors. These students were poorly behaved,

aggressive, and off-task. Engagement corresponded to higher self-efficacy; students were described as seeking help, focusing on productive struggle, and earning higher grades. Disengaged students were described as lacking self-efficacy by not having the persistence to continue with tasks, leading to off-task behaviors, disruptions, and lower scores. These themes are reinforced by the research of Fredericks et al. (2004) presented in Chapter Two.

The third theme, Teacher Mindset, was closely related to self-efficacy. Teacher Mindset encompassed the emotional characteristics teachers used to describe students. Engaged students were termed happy in the research literature. Teachers in the study did not use emotional terms to describe engaged students. However, teachers in the study and researchers in the literature branded disengaged students with a plethora of negative emotions: sad, helpless, heavy, and aggressive. Chardin and Novak's (2021) and Hammond's (2021) views of the impact of teachers' negative mindsets about students were addressed in Chapter Two. If teachers believe students can do something, they often view students differently and create more engaging tasks for them. Teacher mindset has a direct impact on both teacher and student efficacy, also shown in Chapter Two. It was not surprising to find a positive shift in teacher mindset throughout the study regarding the capabilities of students.

Research Question 2 Results

RQ2- What are teachers' perceptions of engagement in students previously noted as disengaged in classes incorporating UDL?

Research Question 2 data were collected from interviews between the researcher and participating teacher after the unit. The interviews were recorded, transcribed,

categorized, and analyzed for themes. Seven out of nine teachers perceived disengaged students became more engaged in the UDL classes. Teachers who did not see engagement increase in disengaged students felt that the change in the UDL offerings was not necessarily a new experience and did not prompt students to engage. One teacher who failed to see a difference in engagement felt that the time of year the strategies were implemented impacted students' responses. She said, “Maybe it would have worked earlier in the year. The kids that are disengaged, it’s the end of the year; they don’t want to try something new.” However, some trends emerged from other respondents that indicated the types of strategies that promoted the re-engagement of students.

Choice

Four teachers noted that previously disengaged students were encouraged by their choices through practice. Teacher C stated, “I noticed certain kids who normally don’t care--a couple of them, since they got to pick, seemed more engaged.” In Teacher G’s UDL class, students could choose to analyze a text or a video that focused on a similar theme. Students had four choices on which to focus their analysis. Teacher G felt these choices “engaged their interests more…and made the content much more meaningful.” The options teachers offered to students are detailed in Research Question 7.

Five of the nine teachers mentioned that increased engagement was evident when students were allowed to choose how they took notes. Teacher D asked the UDL class to work through guided notes with prompts but additionally offered graphic organizers and already completed doodle notes. Teacher B allowed the UDL class to take their own notes, or use the guided notes she provided, to much success. “It’s kind of hit or miss what they write down--if they write anything down. But every single kid who used the

guided notes had them completely filled out." Similarly, even though Teacher A did not perceive disengaged students to be more engaged, she indicated that when she gave her UDL course guided notes (which she typically reserves for students with IEPs), "they were 100% more engaged." This suggests that perhaps some disengaged students were engaged in notetaking but did not sustain their engagement throughout the unit.

Teachers' awareness of the impact of choice on student learning and the subsequently increased engagement from students when given a choice demonstrated the power of autonomous teaching that Reeves described in much of his research. Autonomy is a hallmark of what UDL terms an expert learner. Many teachers voiced their intention to offer students more choices in various stages of a lesson in the following school year, which is a testament to the value of choice.

Collaboration

While every teacher offered the option to work collaboratively during content practice, four teachers noted that collaboration specifically spurred engagement. Teacher C and Teacher F said they were surprised by the success of the collaborative task. Students in Teacher B's class had the option to work with a partner, work with a group, or work with the teacher. Teacher B said that partner work kept disengaged students motivated. She further explained, "Many times when you allow them [students] to work in groups, they're not really working; but we could hear the conversations they were having." These students were on task and used their partners as motivators for engagement. Teacher H felt that struggling and disengaged learners could find support and exciting ways to demonstrate their knowledge for the assigned tasks, emphasizing, "I

was surprised at what my weaker students gave me." Student choice awakened increased creative output, because students had a way to use their strengths to access the content.

Students' success in tackling tasks correlated to the theme of self-efficacy in the engagement qualities presented earlier. Students were completing tasks, focusing on work, and participating with others. In turn, teachers' emotional responses were surprise and satisfaction. Such responses can increase the teachers' self-efficacy in using such strategies. Additionally, much of the success of collaborative tasks allowed teachers to pull aside students who needed extra support.

Focus on Student Needs

Teachers B, C, and F noted that the collaborative tasks they designed allowed them to focus on struggling learners. Teachers B and C included options to work with the teacher during collaborative tasks. This option allowed Teacher C to work with two low-functioning students who did not have IEPs. She indicated that both students came to her table to work during the collaborative time. "They didn't hesitate," she said. She could walk them through the material at a pace that worked for them. Teacher F did not offer students the option to work with her alone but felt that the small groups allowed her to interact with more students and push into groups that needed more support or a gentle nudge to keep on task by using proximity.

Collaboration builds student self-efficacy, especially in classrooms where teachers closely monitor student work and offer feedback, just like the teachers in this study. Students recognized their need for more focused assistance with Teacher C and felt comfortable in the environment to choose that option. Teacher F made better use of feedback time through her interactions with small groups. Students improved their

understanding through peer discussion and expert guidance from the instructor. When the time was short, and chairs were full, such collaborative tasks helped ensure that every student had instructor contact before leaving class for the day.

Participation

Participation might seem obvious, but the choice afforded to all students allowed disengaged students to engage in tasks they usually would not. Teacher H noted that one student who slept in every class was awake and working. “One of my young men didn’t sleep. So, I mean, that’s a huge improvement. Even the rest of the class remarked that he didn’t sleep.” One typically difficult student engaged in tasks in Teacher I’s class. Teacher I exclaimed, “I am enjoying her so much…she has things to say. I’m getting product out of her. I don’t know what to think about it, but I love it.” Teacher B concluded, “You can get some cool things out of kids you don’t think would do cool things. Because they don’t tend to do a lot, but when they’re given some choices and how to show it, they sometimes surprise you.” Many teachers noticed increased participation, which is the first step to closing learning gaps for disengaged learners.

The characteristic qualities teachers used to describe disengaged learners leaned heavily on areas of participation, such as completing homework, having discussions, and asking questions. Behavioral engagement is the precursor to deeper engagement, as presented in Chapter Two. Again, the theme of self-efficacy appeared, but this time on the teacher's side.

The characteristic qualities surrounding disengaged learners were replaced by positive narratives when students engaged in tasks. Terms like *surprise* and *enjoy* indicated that teachers’ mindsets toward those students and their capabilities were

positive. Assuming positive intentions about students allowed teachers to reconsider the types of work these students were capable of and even reassess teaching strategies used to meet these students' needs.

Research Question 3 Results

RQ3- What are teachers' perceptions of student engagement in units incorporating UDL?

Research Question 3 data were collected from interviews after the unit's completion. The interviews were recorded, transcribed, categorized, and analyzed for themes. Five of the nine teachers stated that overall, students in the UDL class were similarly engaged as students in the non-UDL class. Of the five, 100% saw improvement with disengaged learners. It is also important to note that three of the five teachers intentionally chose lower achieving classes with a higher number of struggling learners as their UDL courses.

Teacher I stated, "My non-*UDL* class is the seventh hour, but they are more of my go-getters. I think it was helpful to do the UDL with my sixth hour because I think they needed it, which then ended up working out better." Similarly, Teacher D chose the class that "struggles to be here," concluding that "it really helped them." Teacher C also chose a class that "struggles more." She exclaimed, "It's a good reminder when you've got a lower-achieving group; these strategies obviously work." Teachers intentionally chose UDL structures for classes with greater numbers of struggling students. Discussion of the impact of this choice on the analysis of student scores is discussed in Chapter Five.

Teacher G felt that students were similarly engaged because the interesting content involved a film. However, she noted that students in the UDL class had requested

to do a Harkness discussion, which she had used in the past as a non-obtrusive assessment tool. She did not allow them to have the discussion, but reflected, “I should have let that discussion happen. . .that was a teacher error.” Teacher G indicated that if the discussion the students had requested had been the assessment, instead of 78% of students turning in the work, at least 90% would have done so. Even though this instructor felt that the task she chose was not effective in producing persistent engagement, she reflected on her ability to use creative assessment options to showcase student learning in the future.

The remaining four teachers felt a significant difference in engagement between their UDL and non-UDL classes, despite no significant difference in scores. Teacher H noted a difference, especially in the first two days of implementation in the UDL course and said that the UDL course had better completion of assignments. Students’ increased engagement suggested they could effectively access the content and begin the important process of moving learning to working memory. Teacher F demonstrated an awareness of her instructional choices and their impact on students. She noted that typical instructional methods were boring for students, suggesting that traditional methods were not student-centered. The increased engagement for students using UDL methods increased efficacy in this teacher to evaluate her teaching methods to effectively reach students.

Research Question 4 Results

RQ4- What benefits do teachers see, if any, of using UDL in the classroom?

Research Question 4 data were collected from an interview between the researcher and each teacher participating in the study after the instruction unit. The

interviews were recorded, transcribed, categorized, and analyzed for themes. Teachers' responses included benefits for teachers and students.

Teachers who felt that UDL was better for students noted increased learning (3 responses), increased engagement (5 responses), specific help for struggling learners (3 responses), optimization of student strengths (3 responses), increased creativity (3 responses), and increased enjoyment of the content (2 responses). The emerging themes are broken down below. The themes highlighted the success of UDL training and practice because teachers became aware of the practices, which appeared again in responses to RQ 7. The teachers' awareness of successful UDL strategies and planning increased their self-efficacy in reaching all learners. Reaching every student is imperative to closing learning gaps and tackling engagement issues that plagued K-12 education during this study.

Awareness

Some teachers had a renewed awareness of their learners' variability. Teacher B said the study helped her think about the learners in her room. "There's not just one way to show that you know the material, and it's easy to forget that." One benefit that Teacher G indicated was how offering multiple ways to engage with content helped students overcome weaknesses. As students used a variety of ways to practice the material and were shown the material in various ways, they increased their knowledge of the content. Teacher D also provided multiple ways for students to engage in content and noted that students in her UDL class knew the content better than past units of study that did not include these methods. She said she "felt confident" that students were prepared, because of her use of multiple instruction and assessment methods, which increased both teacher

and student self-efficacy. However, awareness of better instructional methods was not just noted by teachers.

Teacher D mentioned she had overheard students talking about another course that happened to be included in this study. She explained, “I heard (Teacher E’s) kids saying, ‘Why is it so much nicer now in this unit? That's not even the hard unit.’ I was, like, oh, I know why.” The students viewed the content as more enjoyable with UDL strategies in place, and Teacher D understood the power of student-centered learning through UDL practices.

Teacher Mindset

UDL can give teachers confidence that they are reaching their learners because they think of variability up front. Teacher A responded, “If we did all the upfront things instead of constantly feeling like, ‘oh gosh, now I need to differentiate this for this kid and this for this kid.’ That’s ridiculous. Bearing that in mind, I will offer a couple of options. That relieves pressure (on me). We can all do this.” Likewise, two other teachers mentioned the relief of using UDL to address multiple variances in learning at one time.

Earlier in this chapter, Teachers B, C, and F noted that the collaborative tasks they designed allowed them to focus on struggling learners. Teachers did not feel as confident reaching struggling learners as they did in reaching more advanced learners, which is discussed later in this chapter. UDL increased teachers’ efficacy in reaching struggling learners through choice and collaboration. Recall that Teacher F met with more students in one class period through collaborative tasks instead of a typical individual worktime method. UDL allows for optimum use of class time, because barriers to student learning

are considered ahead of time and addressed, freeing up more learning time during instructional minutes.

Better Teaching

Of the benefits for teachers, four teachers mentioned that UDL was simply good teaching or helped them be better teachers. Teacher G reflected, “The more I reflect and recognize the things I’m already doing, the better I will get at it, and the more the kids will benefit as a result.” Teacher B confessed, “It’s the time of year where you’re kind of, like, ‘I want to finish this year and go ahead and start next year.’ I’ve been thinking of ways I can use UDL next year already.” Every teacher found some success in their strategies and was already considering ways to apply them next school year. Increased self-efficacy has positive impacts on student learning. UDL teacher training and practice using strategies impacted student engagement through more effective teaching strategies. These strategies that stuck with teachers are discussed in Research Question 7.

Research Question 5 Results

RQ 5- What barriers do teachers see to implementing UDL in the classroom?

Research Question 5 data were collected from an interview after the unit between the researcher and each teacher participating in the study. The interviews were recorded, transcribed, categorized, and analyzed for themes. Just as determining the barriers to learning in the classroom, the researcher wanted to understand the barriers teachers felt could hinder the successful implementation of UDL.

Time

Time was the top response, mentioned by seven out of nine teachers. Four teachers mentioned the time of year as a barrier (fourth quarter) and indicated that

starting at the beginning of the year would be essential in the future. These teachers suggested that working with teachers, planning, training students, and being consistent with UDL practices from the beginning of the school year would be necessary for positive implementation.

Three teachers suggested that time to prepare or implement UDL effectively could be a barrier. Teacher E said, “It’s just a matter of time to offer an alternate version of what we are doing. The video took me about 20 minutes a day--for a lot of sections that adds up.” Teacher D agreed. “Potentially, I spent more time doing this than they did.” Teacher B felt similarly, but noted that “it did become easier with practice.” Teachers could try UDL practices slowly, adding options during instruction in phases to build the efficacy Teacher B suggested would come with practice. Other teachers suggested that having a partner or group to plan with would have been beneficial and could have reduced planning time. Teacher C explained how this process could work with peers, “If I had a similar collaborating buddy, if I said, ‘Okay, I’ll come up with these two options, you come up with these two options or strategies,’ that would have been so helpful.” In agreement, Teacher H felt that a “group of teachers with the same mindset” would be able to create options for students.

Teachers recognized the benefits of UDL, but upfront time in planning instruction with intention took more time than traditional teaching methods. The ability of participating teachers to consider ways to tackle that time constraint through shared planning demonstrated a growth mindset. They were willing to continue UDL practices alone (as seen in RQ7) but would be more apt to persist through time issues with help in

planning. A growth mindset, however, was a barrier that teachers anticipated could slow implementation success.

Teacher Mindset

Another top barrier to UDL implementation listed by teachers was teacher mindset and often their own. “I just need to get out of my own way sometimes,” Teacher G reflected. While two teachers felt that they created their own barriers through a lack of understanding or by offering students too many choices, others felt that teachers sometimes did not want to try new things. Teacher A said that teachers might balk at the suggestion of UDL, viewing it as “one more thing. That naturally happens whenever a teacher gets told, ‘Oh, here's the strategy you could try.’ Just in general, the lack of motivation to want to do something right.”

The latter point was reflected in the MSTA and district surveys mentioned in Chapter Two. These surveys indicated that teachers were overwhelmed with current workloads, and framing UDL as an additional framework could potentially overshadow its effectiveness. Yet the incredible reflection by many participating teachers regarding creating their own barriers clearly shows the acute awareness of practice that UDL offers. Team implementation of UDL might tackle both time and mindset challenges as teachers shared successful strategies, reflected on failures and improvement plans, and co-planned lessons. While these barriers were within the teachers' control, one barrier, in particular, was not.

Absences

Student absences were a barrier to implementation. Teacher E noted that her engagement problem in a particular class stemmed from student absences. Teacher D

experienced similar issues, with one group of students missing an entire week due to a school-related event. Teachers were used to absences due to Covid, but with the return of sports and academic trips, student learning faced additional strains. If teachers had planned for absence as a barrier to learning, they might have had more processes in place for returning students. Teacher G, for example, planned for absences in advance. She offered both after-school learning sessions and choice in learning tasks that allowed students a chance to catch up at home. Planning for absences was not a topic in the training unit for teachers, which might be why the other barriers mentioned, along with absences, revolved around understanding the fundamentals of UDL.

Efficacy in UDL

Many educators confuse UDL with Differentiated Instruction, which was noted by Meyer et al. (2014) and Novak (2021). These two frameworks support learning together, but they are not the same. These differences were addressed in the UDL training participating teachers completed. Similarly, teachers assumed they were utilizing UDL practices because they offered choices for students. This is another common misconception. Teacher A indicated that she had confused UDL with Differentiated Instruction until the training. Teacher H concluded she "overdid it on choices." Teacher G felt she should have provided more structured choices, noting that she had to try to think beyond choices continually. At first, she thought, "it's just all about free choice, and from this study, obviously, I still have some that ingrained in me that I need to unlearn." In their reflection, six teachers referenced using too many choices or wanting to move beyond simply offering options to other aspects of UDL.

Teachers who indicated their interest in furthering UDL learning demonstrated self-efficacy. Teachers recognized the benefits of offering aligned, relevant options to students in various stages of learning. However, they saw that UDL is more than choices. These teachers were vulnerable to admitting error, they planned for better practice, and they sought deeper learning.

Research Question 6 Results

RQ6- How does UDL training impact teachers' perceptions of students' ability to change factors related to school engagement and academic performance?

Research Question 6 data were collected from Survey Question 3 within a *Qualtrics* survey containing six Likert-type questions with the following statement: *Whether your students do well or poorly in your class may depend on many different factors. Some of these factors might be easier for your students to change than others. How possible do you think it is for your students to change:*

Teacher mindset about students impacts the types of assignments students are given, the expectations placed upon students, and ultimately the performance of those students, as covered in Chapter Two. The following questions correlate to the characteristics of engagement and disengagement identified earlier by teachers in this study and by literature on engagement. Therefore, if teachers feel confident about students' abilities to change effort, behavior, persistence, intelligence, and enjoyment of content, then they feel confident that a disengaged learner who trends in the negative in those categories could improve in these areas.

The participating teachers answered the following Likert-type questions in a *Qualtrics* survey before UDL training and teaching their units. They answered these

questions again in a *Qualtrics* survey after UDL training and the completion of their units. Each question is broken down below to analyze the change in perception teachers had, if any, regarding students' learning practices and abilities, and thus teachers' growth mindset regarding the variance of learners in their classrooms.

Survey Question 3.1

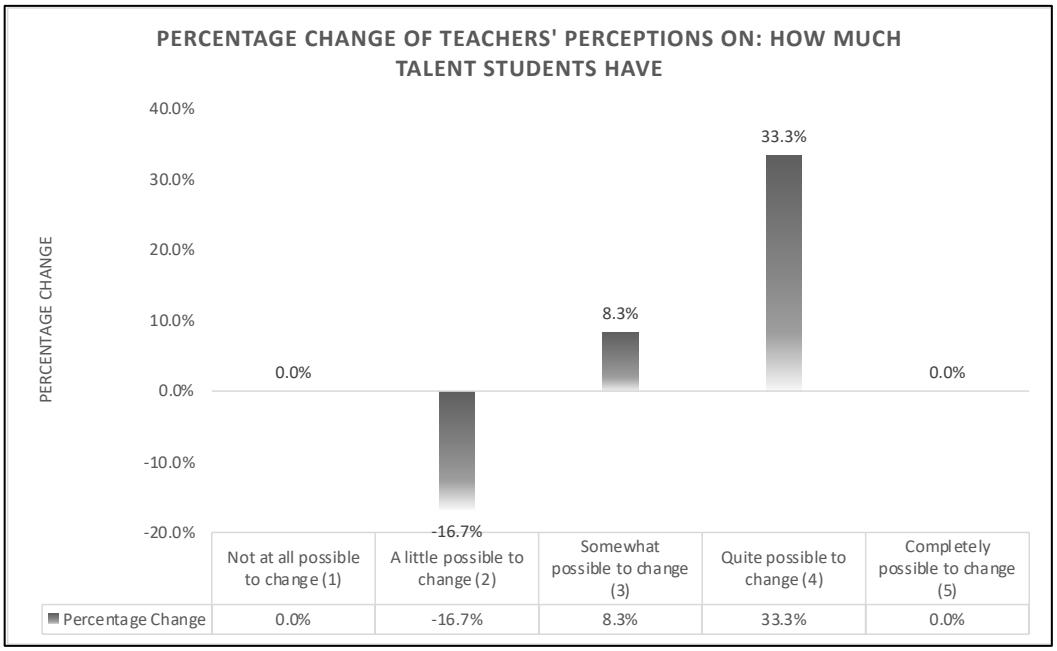
Survey Question 3.1 results included data regarding teachers' perceptions of how possible it is for students to change *how much talent students have*. The results indicated that 0% of the participants perceived that it was *not at all possible to change* for both the pre- and post-survey yielding a 0% change in results. Whereas 16.7% of the participants perceived that it was *a little possible to change* for the pre- survey and 0% for the post survey, yielding a -16.7% change.

Twenty-five percent of the participants perceived that it was *somewhat possible to change* for the pre-survey and 33% for the post survey, yielding an 8% change. Thirty-three percent of the participants perceived that it was *quite possible to change* in the pre-survey and 66% for the post-survey, yielding a 33% change.

Finally, 0% of the participants perceived that it was *completely possible to change* for both the pre- and post-survey yielding a 0% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change is* displayed in Figure 3.

Figure 3

Percentage Change of Teachers' Perceptions: Talent Students Have



Note. Research Question 6; Survey Question 3.1

Survey Question 3.2

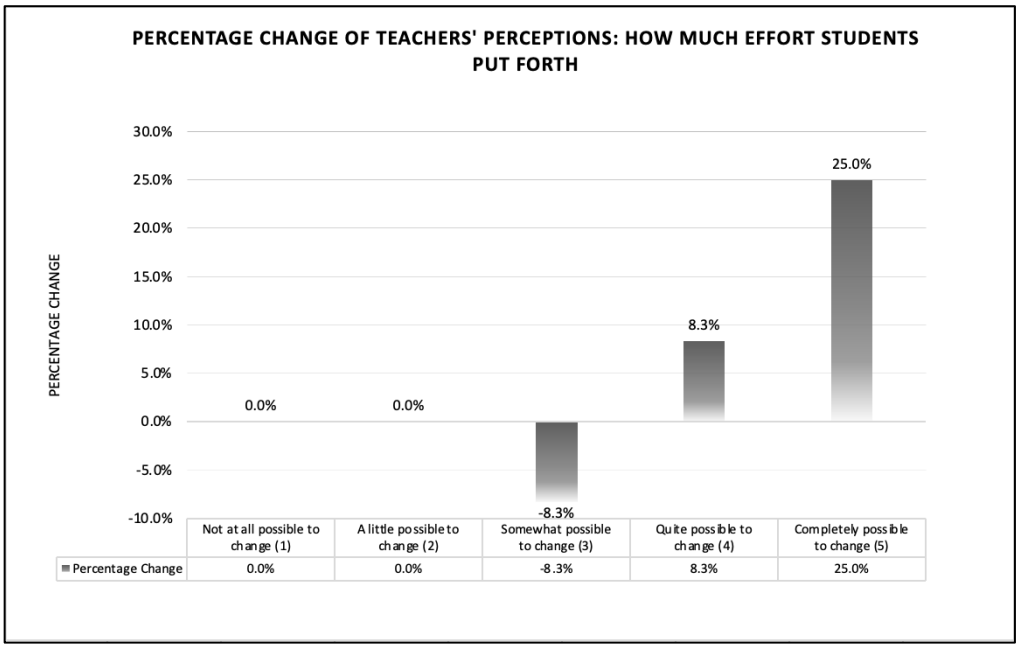
Survey Question 3.2 results included data regarding teachers' perceptions of how possible it is for students to change *How much effort students put forth.* The data results indicated that 0% of the participants perceived that it was *not at all possible to change* for both the pre- and post-survey yielding a 0% change in results. Similarly, 0% of the participants perceived that it was *a little possible to change* for the pre-survey and the post-survey, yielding 0% change.

Eight and three-tenths percent of the participants perceived that it was *somewhat possible to change* for the pre-survey and 0% for the post survey, yielding a -8.3% change. Twenty-five percent of the participants perceived that it was *quite possible to change* in the pre-survey and 33.3% for the post-survey, yielding an 8.3% change.

Finally, 41.7% of the participants perceived that it was *completely possible to change* for both the pre-survey and 66.7% post-survey, yielding a 25% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change is* displayed in Figure 4.

Figure 4

Percentage Change of Teachers' Perceptions: How Much Effort Students Put Forth



Note. Research Question 6; Survey Question 3.2

Survey Question 3.3

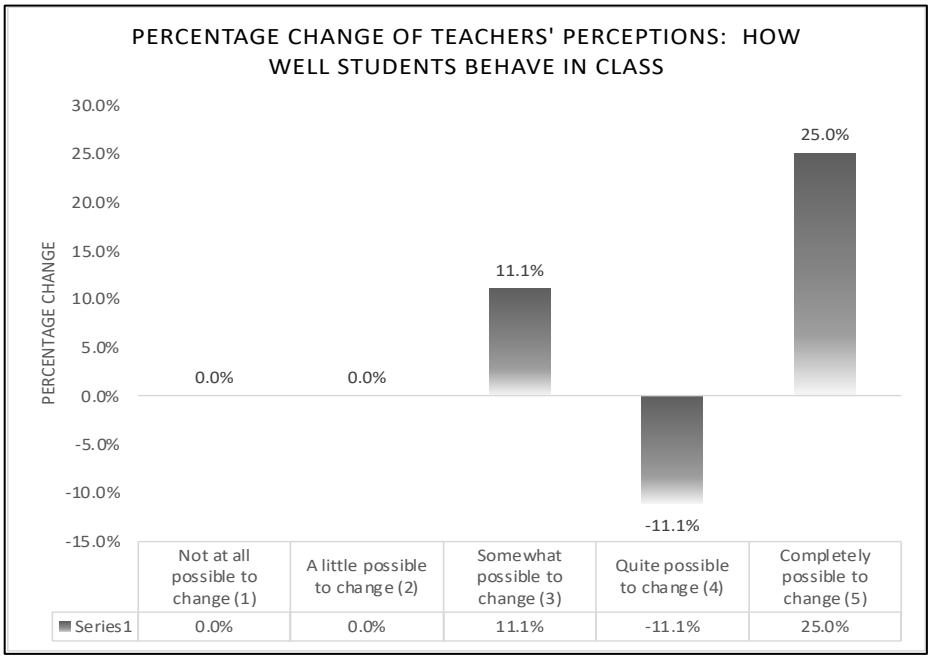
Survey Question 3.3 results included data regarding teachers' perceptions of how possible it is for students to change *How well students behave.* The data results indicated that 0% of the participants perceived that it was *not at all possible to change* for both the pre- and post-survey yielding a 0% change in results. Similarly, 0% of the participants perceived that it was *a little possible to change* for the pre- survey and 0% for the post survey, yielding a 0% change.

However, zero percent of the participants perceived that it was *somewhat possible to change* for the pre-survey, and 11.1% for the post survey, yielding an 11.1% change. Thirty-three percent of the participants perceived that it was *quite possible to change* in the pre-survey and 22.2% for the post-survey, yielding an -11.1% change.

Finally, 41.7% of the participants perceived that it was *completely possible to change* for the pre-survey and 66.7% for the post-survey yielding a 25% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change is* displayed in Figure 5.

Figure 5

Percentage Change of Teachers' Perceptions: How Well Students Behave in Class



Note. Research Question 6; Survey Question 3.3

Survey Question 3.4

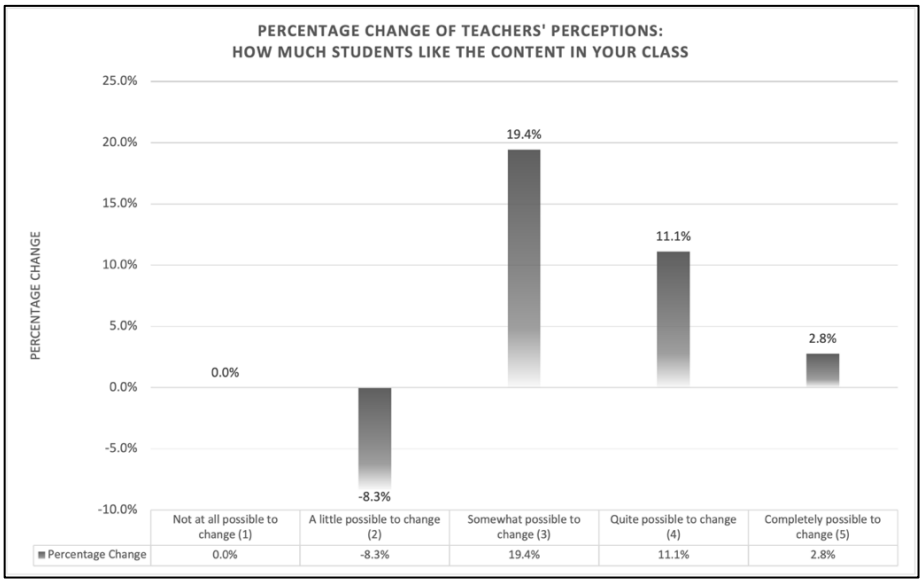
Survey Question 3.4 results included data regarding teachers' perceptions of how possible it is for students to change *How much students like the content of a class*. The data results indicated that 0% of the participants perceived that it was *not at all possible to change* for both the pre- and post-survey yielding a 0% change in results. Whereas 8.3% of the participants perceived that it was *a little possible to change* for the pre-survey and 0% for the post survey, yielding a -8.3% change.

Twenty-five percent of the participants perceived that it was *somewhat possible to change* for the pre-survey and 44.4% for the post survey, yielding a 19.4% change. Thirty-three percent of the participants perceived that it was *quite possible to change* in the pre-survey and 44.4% for the post-survey, yielding an 11.1% change.

Finally, 8.3% of the participants perceived that it was *completely possible to change* for the pre-survey and 11.1% for the post-survey yielding a 2.8% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change is* displayed in Figure 6.

Figure 6

Percentage Change of Teachers' Perceptions How Well Students Like Content



Note. Research Question 6; Survey Question 3.4

Survey Question 3.5

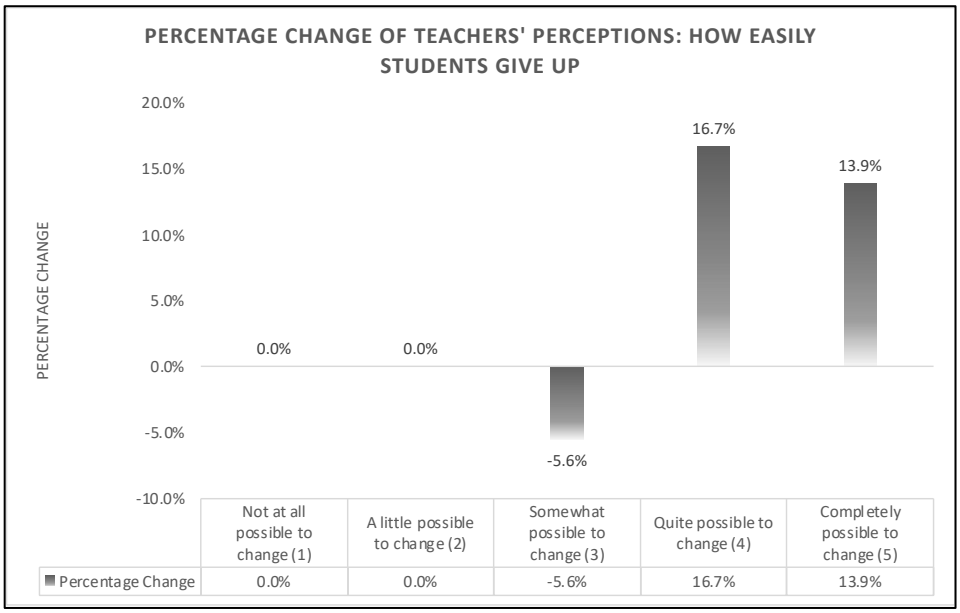
Survey Question 3.5 results included data regarding teachers' perceptions of how possible it is for students to change *How easily students give up*. The data results indicated that 0% of the participants perceived that it was *not at all possible to change* for both the pre- and post-survey yielding a 0% change in results. Likewise, 0% of the participants perceived that it was *a little possible to change* for the pre- and post- survey, yielding a 0% change.

Sixteen and seven-tenths percent of the participants perceived that it was *somewhat possible to change* for the pre-survey and 11.1% for the post survey, yielding an -5.6% change. Fifty percent of the participants perceived that it was *quite possible to change* in the pre-survey and 66.7% for the post-survey, yielding a 16.7% change.

Finally, 8.3% of the participants perceived that it was *completely possible to change* for both the pre-survey and 22.2% post-survey yielding a 16.7% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change is* displayed in Figure 7.

Figure 7

Percentage Change of Teachers' Perceptions: How Easily Students Give Up



Note. Research Question 6; Survey Question 3.5

Survey Question 3.6

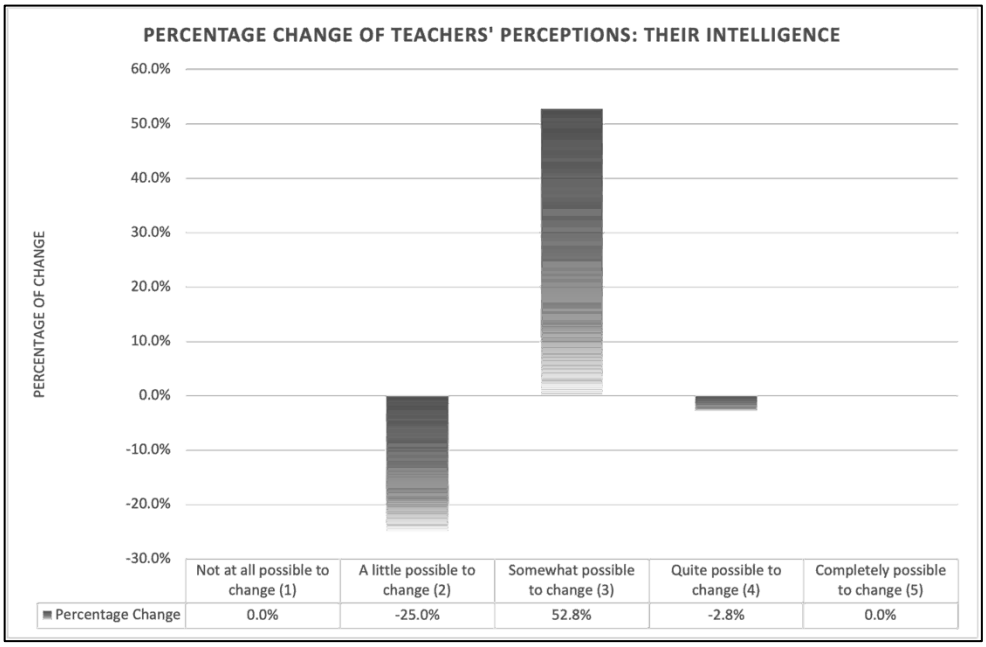
Survey Question 3.6 results included data regarding teachers' perceptions of how possible it is for students to change *Students' intelligence.* The data results indicated that 0% of the participants perceived that it was *not at all possible to change* for the pre- and post- survey yielding a 0% change in results. Whereas 25% of the participants perceived that it was *a little possible to change* for the pre-survey and 0% for the post-survey, yielding a -25% change.

Twenty-five percent of the participants perceived that it was *somewhat possible to change* for the pre-survey and 77.8% for the post survey, yielding a 52.8% change. Twenty-five percent of the participants perceived that it was *quite possible to change* in the pre-survey and 22.2% for the post-survey, yielding a -2.8% change.

Finally, 0% of the participants perceived that it was *completely possible to change* for both the pre- and post-survey yielding a 0% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change is* displayed in Figure 8.

Figure 8

Percentage Change of Teachers' Perceptions of Students' Intelligence



Note. Research Question 6; Survey Question 3.6

Overall, teachers' perception of students' abilities improved. UDL training addressed the variance of learners and the situations that impact student learning on any day or moment. Through training and practice, teachers developed a stronger view of

students' abilities, which could create huge gains for students who struggle with engagement and learning. Recall the characteristic qualities teachers used to describe disengaged learners leaned heavily on areas of participation, such as completing homework, having discussions, and asking questions.

The characteristic qualities surrounding disengaged learners were replaced by positive narratives when students engaged in tasks. Terms like *surprise* and *enjoy* indicated that teachers' mindsets toward those students and their capabilities were positive. Assuming positive intentions about students allowed teachers to reconsider the types of work these students were capable of and even reassess teaching strategies used to meet these students' needs.

Research Question 7 Results

RQ 7- How does UDL training impact teachers' perceptions of their abilities to meet students' jagged learning profiles?

Research Question 7 data were collected from Survey Question 4 within a *Qualtrics* survey containing three Likert-type questions with the following statement: *Please answer the following questions regarding your confidence in dealing with the following variability profiles of students below.* Teacher mindset about their abilities to reach all learners impacts the types of assignments students are given, the learning environment, and ultimately the performance of those students, as covered in Chapter Two. The participating teachers answered these Likert-type questions in a *Qualtrics* survey before UDL training and teaching their units. They answered these questions again in a *Qualtrics* survey after UDL training and the completion of their units. Each

question is broken down below to analyze the change in perception teachers had, if any, regarding their teaching practices and abilities.

Survey Question 4.1

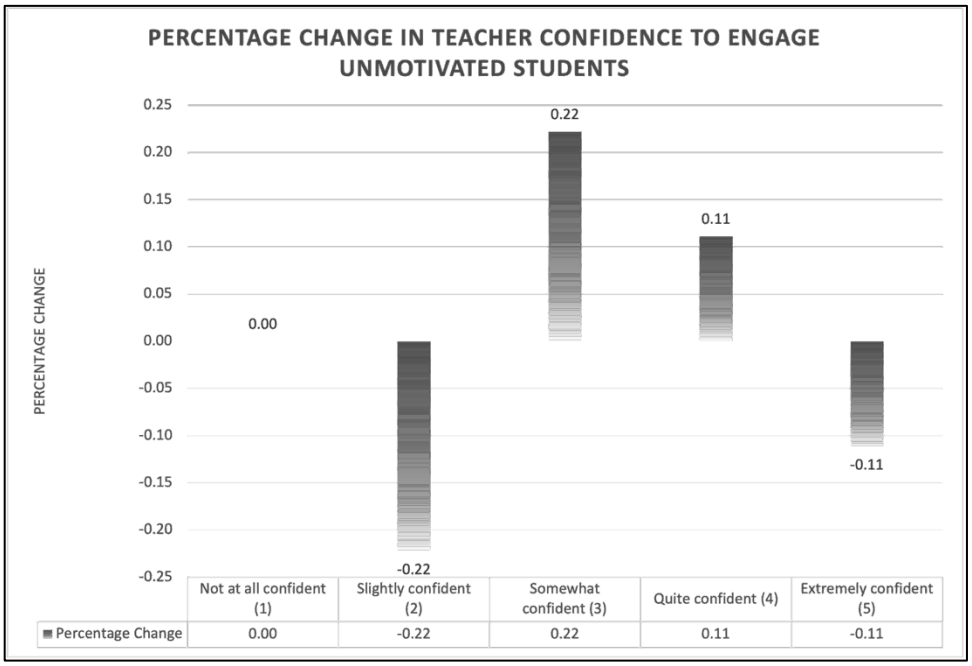
Survey Question 4.1 results included data regarding teachers' perceptions of how confident they were in *engaging students who are typically not motivated*. The results indicated that 0% of the participants perceived they were *not at all confident* for the pre- and post-survey, yielding a 0% change in results. Whereas 33.3% of the participants perceived they were *slightly confident* for the pre- survey and 11.1% for the post survey, yielding a -22.2% change.

Forty-four and four-tenths percent of the participants perceived they were *somewhat confident* for the pre-survey and 66.7% for the post survey, yielding a 22.2% change. Eleven and one-tenths percent of the participants perceived they were quite confident in the pre-survey and 22.2% post-survey, yielding an 11.1% change.

Finally, 11.1% of the participants perceived that they were *extremely confident* in the pre-survey and 0% post-survey, yielding an -11.1% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change is* displayed in Figure 9.

Figure 9

Teachers' Confidence in Engaging Unmotivated Students



Note: Research Question 7; Survey Question 4.1

Survey Question 4.2

Survey Question 4.2 results included data regarding teachers' perceptions of how confident they were in *helping their school's most challenging students to learn*. The results indicated that 11.1% of the participants perceived they were *not at all confident* for both the pre-survey and 0% post-survey yielding an -11.1% change in results. Whereas 22.2% of the participants perceived they were *slightly confident* for the pre-survey and 11.1% for the post survey, yielding a -11.1% change.

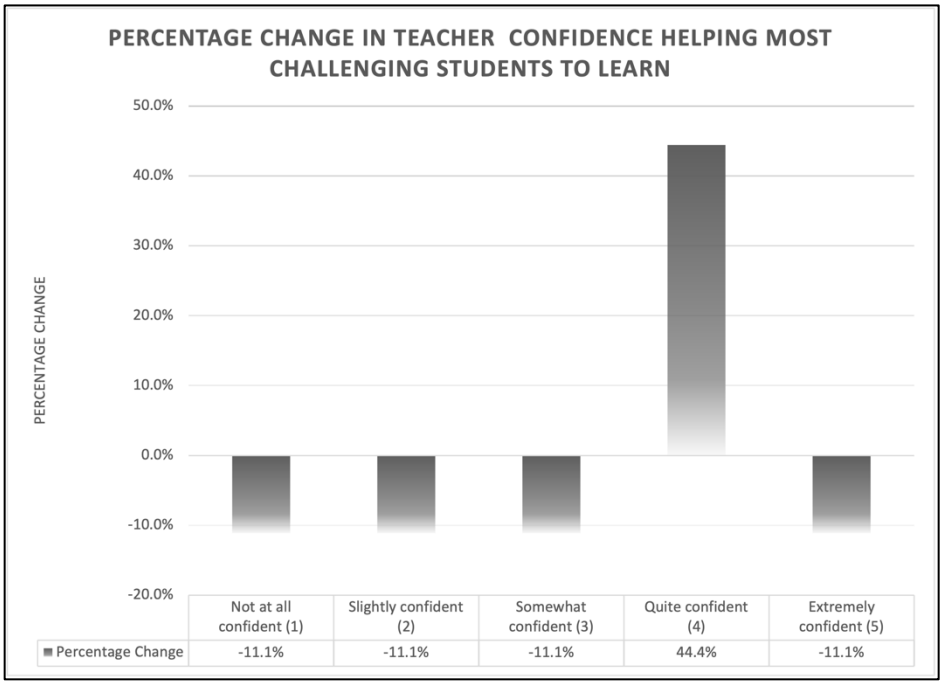
Forty-four and four-tenths percent of the participants perceived they were *somewhat confident* for the pre-survey and 33.3% for the post survey, yielding an -11.1%

change. Eleven and one-tenths percent of the participants perceived they were quite confident in the pre-survey and 55.6% for the post-survey, yielding a 44.4% change.

Finally, 11.1% of the participants perceived that they were *extremely confident* in the pre-survey and 0% post-survey, yielding an -11.1% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change is* displayed in Figure 10.

Figure 10

Teacher's Confidence in Helping Most Challenging Students to Learn



Note: Research Question 7; Survey Question 4.2

Survey Question 4.3

Survey Question 4.3 results included data regarding teachers' perceptions of how confident they were in *meeting the needs of their most advanced students*. The results indicated that 0% of the participants perceived they were *not at all confident* for the pre-

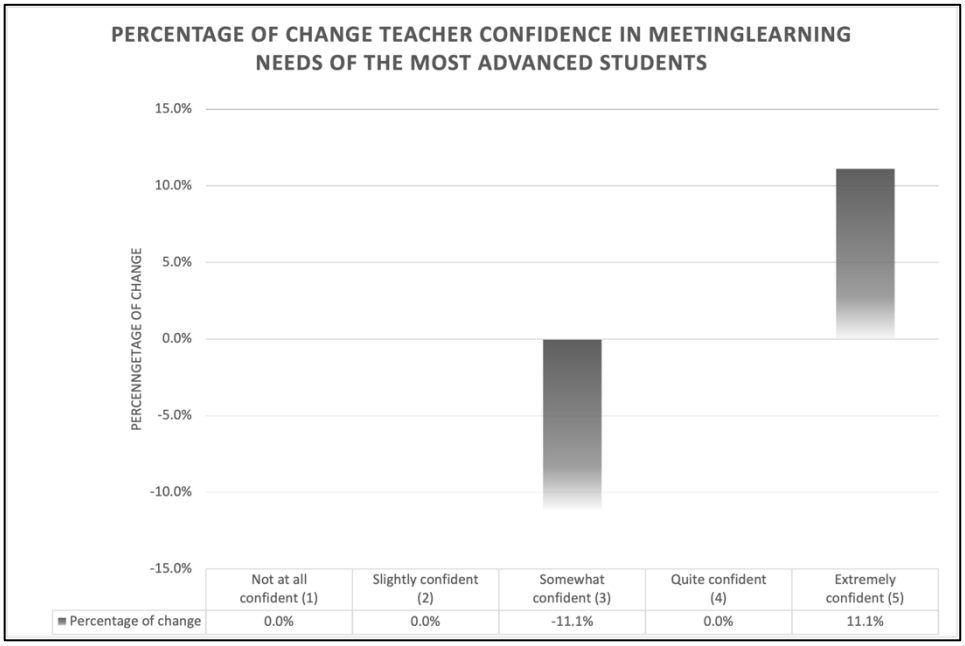
and post-survey, yielding a 0% change in results. Similarly, 0% of the participants perceived they were *slightly confident* for the pre- and post-survey, yielding a 0% change.

Thirty-three and three-tenths percent of the participants perceived they were *somewhat confident* for the pre-survey and 22.2% for the post-survey, yielding an -11.1% change. Fifty-five and five-tenths percent of the participants perceived they were quite confident in the pre- and post-survey, yielding a 0% change.

Finally, 11.1% of the participants perceived that they were *extremely confident* in the pre-survey and 22.2% post-survey yielding an 11.1% change in results. A summary of percentage changes from *Not at all possible to change* to *Completely possible to change* are displayed in Figure 11.

Figure 11

Teacher's Confidence in Meeting the Needs of Advanced Students



Note: Research Question 7; Survey Question 4.3

Overall, teachers' self-efficacy in teaching all learners was positive. There was more growth in confidence than a loss in confidence as a whole. However, in areas where extreme confidence shifted slightly, teachers likely reflected on their strategies, as evidenced in their interview questions. Unsuccessful strategies and an awareness of the variance of learners in classrooms impacted confidence levels. Since teachers were willing to learn more about UDL strategies and try strategies in future assignments, these small shifts could simply be reality checks. However, these drops also leave room for future study regarding the areas where teachers felt less efficacious, particularly regarding *the most challenging students.* Related to the positive increase in mindset regarding students' abilities is the use of effective strategies to reach all students. The effect of training on instructional practice to meet student needs should be seen through the effective use of UDL strategies.

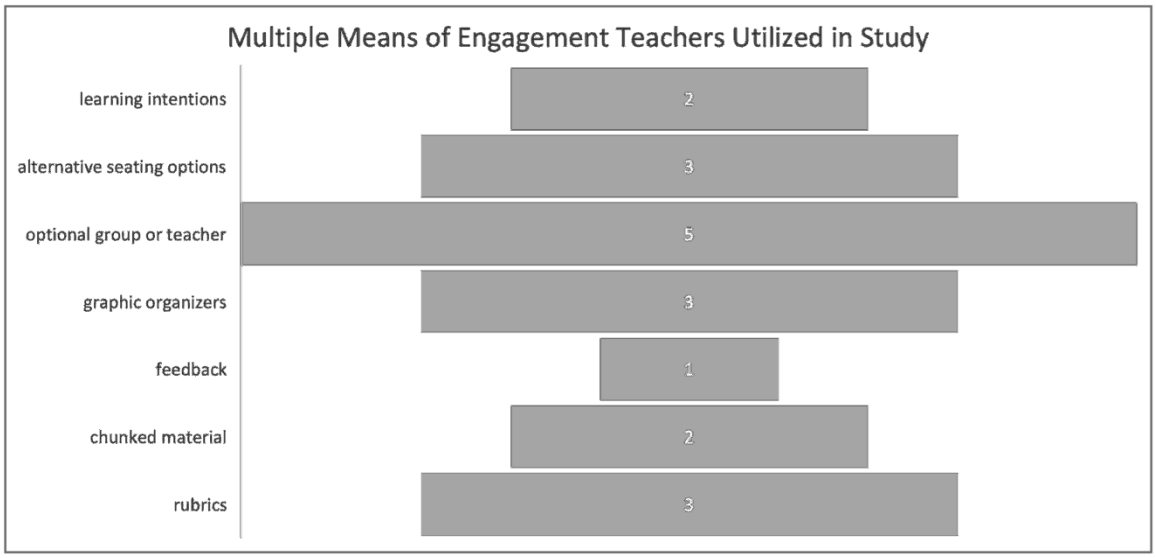
Interview

Teachers identified the UDL strategies they used in an interview. The researcher provided teachers with resources and strategies after training, which also included strategies. Teachers could choose the strategies most helpful for their planned unit and the students learning it. The researcher asked each teacher to explain what methods they used in their UDL class. These responses correlated to teachers' confidence in teaching all students and suggested UDL training had positive implications on teacher practice.

Within the three principles of UDL, every teacher said they offered Multiple Means of Engagement through at least one of the following items. The number of teachers who referenced the option is listed next to the option displayed in Figure 12.

Figure 12

Multiple Means of Engagement Teachers Utilized in Study

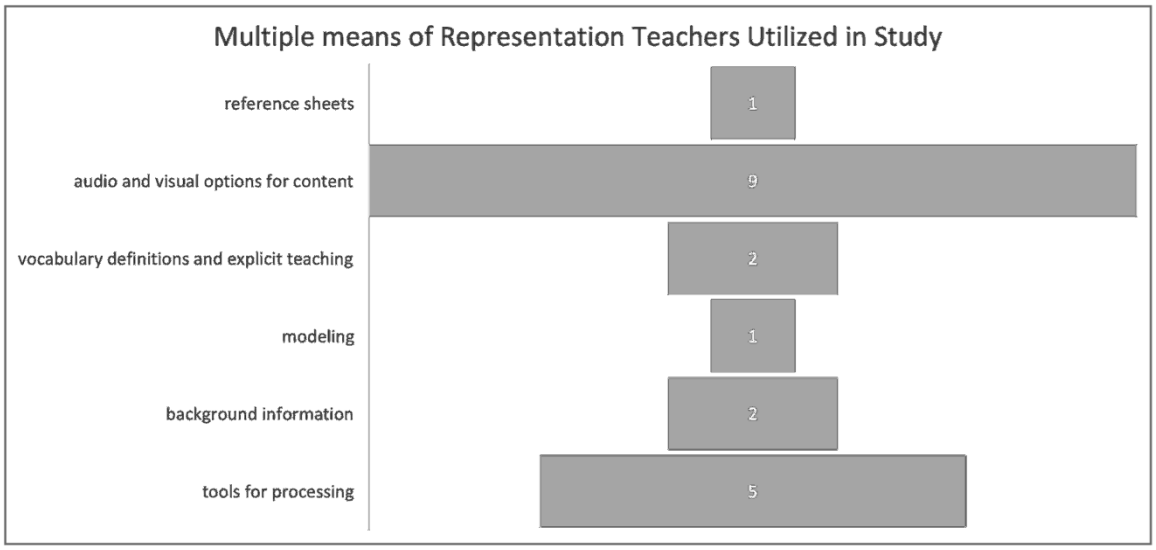


Multiple Means of Engagement are tools and strategies used within a lesson that allows students to engage and persist with content material in various ways. All the options teachers utilized allowed students to engage physically and mentally in tasks with support available. Outside of feedback on learning intentions, many of these options are common accommodations for students using special services. However, all students can benefit from support that enable them to engage initially with tasks and then persist in them despite challenges.

Within the three principles of UDL, every teacher said they offered Multiple Means of Representation through at least one of the following items. The number of teachers who referenced the option is listed next to the option displayed in Figure 13.

Figure 13

Multiple Means of Representation Utilized by Teachers in Study

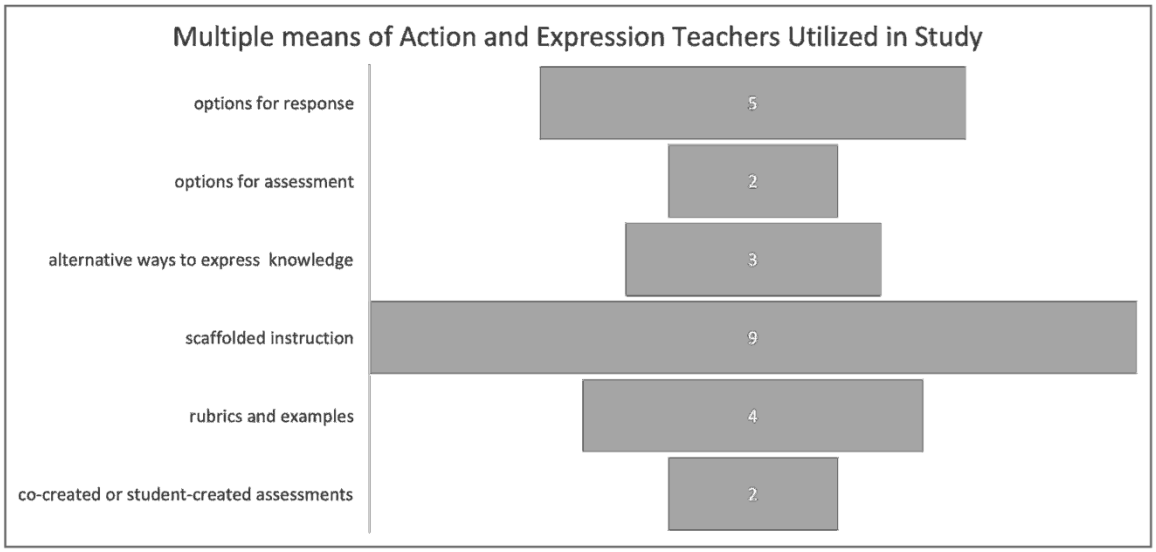


Multiple Means of Representation allowed students to receive and practice content in various ways. The easiest and most utilized method was providing options for students with lecture or hard copy work, which every instructor utilized. These methods reinforce learning concepts for students because they can experience learning through multiple modalities, reducing cognitive load and increasing working memory.

Within the three principles of UDL, every teacher said they offered Multiple Means of Action and Expression through at least one of the following items. The number of teachers who referenced the option is listed next to the option displayed in Figure 14.

Figure 14

Multiple Means of Action and Expression Teachers Utilized in Study



Allowing students to demonstrate their learning in various ways increases student autonomy and creativity. Teachers in the study not only provided multiple ways for students to be assessed, but they offered multiple ways for students to track their learning. Because teachers provided explicit rubrics, examples of various levels, and scaffolded instruction, students could pace and evaluate their progress. The highest goal of UDL is to create expert learners who can do these tasks.

The researcher asked the teachers to consider any strategies they wanted to continue using in upcoming lessons or the following year. Many teachers thought about how they might refine practices based on their experiences, a clear sign of efficacy in teaching practice and a nod to the effectiveness of UDL training and practice. Five teachers noted they wanted to continue to offer choices in representation, engagement, and expression. Teachers H and G wanted to use more structured choices and modeling. Two teachers referenced using co-constructed assessments, even though they did not

choose those options for the study. Most telling in the impact of the training and practice was Teacher E, who indicated the timing of the study impacted UDL. She felt multiple means of the presentation were necessary to her content area and was excited to try to co-create options with students in the future. “We can imagine, ‘tell me something.’ I may want to try that. I’d be interested to know if they would even do that if they had the choice.” Despite the time crunch that she felt impacted the study, she still found positive results enough to continue using UDL in future courses and at the highest level of practice by co-constructing with students.

Group work and station work were also leading topics for four teachers as they thought about the following year. A couple of instructors began these strategies immediately following the close of the study. Instructor D started a small group assessment immediately after the study, where students had to discuss their theories in groups and explain their thinking. She noted that the discussion is what some students needed to fully understand the content because the assessment scores were much higher. Teacher H also used one of her successful activities in another class upon completing the study and had similar success.

Overall, the impact of UDL training and practice had a great impact on participants. It led to greater awareness of best practices and commitment to the continued use of UDL strategies. The benefit of teaching practices that reach all learners is an increased opportunity for engagement and deep learning of content for students. Better teaching practices can lead to smaller achievement gaps for the most vulnerable learners.

Summary

This mixed-method study indicated that UDL positively impacted student engagement through the qualitative analysis of surveys and interviews. Quantitative data analysis showed that UDL did not affect student achievement as expected. However, one must consider that many teachers intentionally chose lower-performing classes for UDL strategies. Analysis of teacher interviews triangulated with the Likert Scale questions revealed areas of improvement needed in teacher UDL training that could potentially impact disengaged learners. However, UDL training for teachers did show improvements in teachers' mindsets regarding student efficacy and teachers' confidence in teaching the variance of learners in their classrooms. Additionally, teacher interviews suggested that teachers found benefits in the UDL framework and were committed to using the strategies in the future.

Chapter Five: Discussion

Overview

The researcher's primary purpose of this study was to investigate, through a mixed-methods approach, if teachers who applied Universal Design for Learning (UDL) to a unit of study noted increased engagement in students whose teachers identified as "disengaged," compared to students in the same unit of study without UDL methods applied. Additionally, the researcher sought to determine if students in a UDL course have more significant achievement than students in the same unit of study without the UDL framework applied. The researcher aimed to ascertain if UDL would benefit the participating district's students, particularly those not utilizing special services.

The study occurred in the spring of 2022 and involved one middle school teacher and eight high school teachers. Each teacher took a three-hour UDL training course offered by the district. Teachers were asked to complete a pre-survey before beginning the study. Teachers used principles of the UDL framework in one class, but did not use them in another class with the same content. Teachers tracked student pre- and post-unit scores and noted which students before the unit were disengaged. After the completion of the unit, teachers took another survey and participated in an interview with the researcher. By triangulating this data using quantitative and qualitative methods, the researcher hoped to validate UDL as a reasonable approach to helping re-engage disengaged learners in the district and ultimately provide a way to help all students succeed.

Null Hypothesis 1

NH1- There is no difference in increases in unit grades of students who participate in UDL than students who do not participate in UDL.

The researcher conducted a preliminary *F*-test, which denoted variances were equal. Therefore, a Two-Sample *t*-test Assuming Equal Variances was conducted to see if students who participated in UDL were significantly different from students who did not participate in UDL. The analysis revealed that scores of the students who participated in UDL (M = 0.780, SD = 0.21) were not significantly higher than those of the non-UDL students (M = 0.75, SD = 0.21); $t(198) = 0.78$, $p = 0.22$. The researcher failed to reject the null hypothesis and concluded that there is no difference between students' increase in unit grades for students who participate in UDL than students who do not participate in UDL.

Null Hypothesis 2

NH2- There is no difference in unit grade increases of students whom teachers identified as disengaged who participate in UDL than those who do not participate in UDL.

The researcher conducted an Analysis of Variance (ANOVA) to determine whether the paired pre- and post-unit scores were significantly different between the UDL and Non-UDL groups, both for engaged and disengaged students. Because the means of the groups were equal at $p \leq .05$, the researcher conducted a post hoc Scheffé test. Post hoc analyses using the Scheffé post hoc criterion for significance indicated no significant difference between groups. The researcher failed to reject the null hypothesis and concluded that the final grades showed no difference in increase between all four classes. Thus, UDL strategies did not impact student scores in this study.

Analysis of Hypotheses

The researcher expected that if engagement increased in the UDL classes, compared to non-UDL classes, the grades would also be higher in the UDL groups. There was no significant difference in the groups to suggest differences in the grades of these two groups of disengaged students. One group's scores were not lower than another, so significant differences could be found with more extensive and more structured studies in the future. In interviews, five of the nine teachers stated that students in the UDL class were similarly engaged as students in the non-UDL class. This engagement is essential to note because three of the five teachers intentionally chose lower achieving classes with a higher number of struggling learners as their UDL courses. Their statements suggest that lower achieving classes were keeping up with the higher-performing classes. In that case, the lack of difference in scores between the two classes could indicate that achievement overall improved for the UDL course. However, since the data from previous units were not compared for both classes in this study, further investigation is needed.

In interviews, teachers indicated that there was better engagement of previously disengaged students in their UDL courses, despite data showing no significant difference in grades. Teachers listed several specific reasons for the re-engagement of these students, including choice, better participation, collaboration, and teachers' ability to focus on struggling learners. If this is the case, why would there not be a difference in grades of those students who were disengaged in a UDL course compared to disengaged students in the non-UDL course?

Several influences might have contributed to the lack of difference in achievement between both the UDL and non-UDL classes for both engaged and

disengaged learners. One of these is the time of year the study took place. Seven of the nine participating subjects were EOC/MAP tested areas. The study took place right before state testing. It is plausible that the teachers' units were not covering new or more complex material. Students were already scoring fairly high on pre-unit quizzes in these tested contents, there would be little room for growth from pre to post test. Additionally, in most school districts, the fourth quarter is not only the window for state testing, but it happens when many activities compete in championships or take field trips. Teacher D and Teacher E referenced student absences related to school events as an issue. Two teachers specifically offered feedback that the study had "bad timing."

As referenced in Chapter One, the pandemic impacted students and teachers. It is more difficult at the end of any given year to engage students anticipating the last day of school, especially during the 2021-2022 school year. Teacher E referenced the fact in her interview. Other teachers mentioned students who were not participating despite UDL intervention. Therefore, a lack of participation by students would impact unit scores and the overall increase from pre- to post-unit.

The last issue that could influence student scores is the length and depth of the unit of study. Teachers were spread across multiple disciplines and could use their expertise to choose upcoming units of study to try UDL principles and strategies. Some units were a few days, some a week, and some two weeks. No doubt, given that the study took place in the fourth quarter and most participants had state testing on the horizon, they were limited in the units they could choose for analysis in this study. Additionally, as many teachers noted in their reflections, students need to be set up with the structures from the beginning of the year. This idea is supported by CAST and the work of Dr.

Novak, so students were not given much time to adjust to new strategies and procedures in such a short period. Overall, the results of the hypotheses demonstrate the importance of starting early in the year, modeling for students, teaching them the strategies, and being consistent with the strategies unit after unit.

Research Question 1

RQ1- What characteristics do teachers use to identify students as engaged or disengaged?

The researcher pulled terms used in previous studies regarding engagement and compared those terms to teachers' responses when asked to identify the characteristics of disengaged and engaged students. The participants' responses aligned with the research on engagement and disengagement characteristics presented in Chapter Four. Likewise, many of these themes reappeared in the interview as teachers explained their perception of engagement between classes and learners addressed in Research Questions 2 and 3. The accuracy of teachers in identifying engaged and disengaged students helped ensure they were targeting disengaged students with UDL options that would best engage them. Teachers referenced disengaged students or their re-engagement with similar terms in the interviews.

Participating teachers accurately identified disengaged learners when compared with the characteristics found in the literature on engagement. These terms involved either students' behavioral compliance or efficacy. Teachers described students in interviews with characteristics such as *poor grades, lack of participation, not turning in work, sleeping,* and *being off task* or *talkative*. Teachers presented different characteristics for the same students upon re-engagement. They used terms such as *on*

task, turning in work, producing product, and *focusing*. Establishing the accuracy of teachers' identification of engaged and disengaged students gave credibility to the effect of UDL on the learners these same teachers identified as disengaged.

In Figure 2, engagement behaviors and descriptors are matched with an opposing behavior and descriptor related to disengagement. It would make sense that a learner identified with the characteristics of disengagement would be described with the opposing characteristics of engagement upon re-engagement in learning. Teachers in this study used such opposing descriptors as students engaged with coursework.

Teacher I recalled that one targeted student was working and producing an impressive product. The teacher was surprised by this student's progress instead of having continual conflicts with the student over not turning in work. Similarly, teacher B indicated that partner work helped targeted students to reengage with work. She noted that she could hear the on-task conversations and that students completed the assignment. She felt that choice allowed students who "don't tend to do a lot" to shine.

Off-task behavior was also a problem for some disengaged students in Teacher F's course and was thwarted by proximity and group check-in. Teacher F also stated that some disengaged students had taken advantage of some online learning options she had offered for the first time. The station activity was the most engaging strategy for those students because they were focused and collaborating. One particular student identified as disengaged by Teacher H due to frequently sleeping in class, was awake for and actively participating in the UDL activities she provided. Finally, Teacher C noted that choice in group work and working with the teacher allowed a couple of disengaged learners with

low scores and off-task behavior to thrive on the assignment, because they could collaborate and better focus on the tasks at hand.

Further, when teachers spoke of engaged students, they used terms like *surprise, enjoy,* and *exciting*. These terms suggest a positive mindset regarding students and their capabilities. The engagement of learners becomes even more vital through this lens. If teacher mindset is affected by student engagement, we want to empower teachers to engage all students, so they can each benefit from instruction driven by a positive mindset.

Overall, teachers accurately identified disengaged learners when compared to research literature. They were able to design options that best met those learners' needs, increasing the chances of success for those students. Since most participating teachers found increased engagement in this sub-set of learners, the positive experience built their confidence in working with students who accurately displayed characteristics of being disengaged, which is demonstrated in their responses detailed in Research Question 7, presented in Chapter Four and their responses to Research Question 2.

Research Question 2

RQ2- What are teachers' perceptions of engagement in students previously noted as disengaged in classes incorporating UDL?

Seventy-seven percent of participants agreed that UDL strategies improved the engagement of students who had been identified as disengaged. Given that the units teachers chose for this study varied in length and were relatively short, such success suggested that UDL strategies could benefit disengaged students. Two themes emerged as the leading cause of this engagement: autonomy and collaboration. Autonomy was cited

by over half of the teachers in the study, and collaboration was cited by 45% of the teachers in the study as two key strategies that promoted the engagement of disengaged students. In some cases, autonomy in assignments allowed students to choose which area they struggled with most and how to complete the task. Asset-based assignments allowed disengaged students to tackle weak areas using their strongest approaches, and teachers perceived this behavior as participatory, thus identifying students as engaged. Positive learning experiences increased student self-efficacy and persistence in completing tasks. Likewise, student engagement increased teacher self-efficacy in the plan for continued use of the successful UDL strategies. The success teachers experienced motivated them to continue to use these strategies, which is discussed in this section in Research Question 7.

Despite seeing a positive impact, the teachers' responses revealed areas of improvement that could be made to district training and the level of support that could be offered to teachers who embark on UDL implementation in their classrooms in the future. As covered in Chapter Two, teachers will abandon UDL when they do not see success immediately. This is potentially the case with teachers who did not immediately see positive results from their efforts in this study. Supporting teachers in brainstorming, offering observation and feedback, and supporting teams in embedding UDL in the PLC framework will be necessary for the district and those embarking on future studies. These issues were limitations in this study.

The most significant outcome of increased engagement for disengaged students is the potential to close learning gaps. While quantitative data did not show a significant difference, disengaged students' re-engagement with school is important to recognize.

As presented in the section on learning and engagement in Chapter Two, increasing students' will to commit to learning is the first step in a learning task. Engaging formerly disengaged learners is the first step to bridging the gap in their learning. UDL showed improvements in this area as a successful tool for accomplishing the goal of increased engagement and decreased gaps in learning.

Research Question 3

RQ3- What are teachers' perceptions of student engagement in units incorporating UDL?

Of the participants, four of nine teachers believed that their UDL classes were more engaged than their non-UDL classes. The remaining five teachers felt their UDL classes engaged similarly to their non-UDL courses. Of the subset of teachers who saw similar engagement, 60% intentionally chose a UDL class with more struggling and disengaged learners.

Five of the nine participants felt that engagement was similar when comparing the UDL and non-UDL courses. However, these same participants stated that disengaged learners were more engaged in the UDL classes. Additionally, while these five teachers felt that engagement was the same between their UDL course and non-UDL course during the chosen unit, three teachers initially chose struggling classes as their UDL group. Suppose lower achieving classes were keeping up with the higher-performing classes. In that case, the lack of difference in scores between the two classes could indicate that achievement overall improved for the UDL course. Unfortunately, comparing past scores between the two classes was out of the scope of this study. Still, it

would be an exciting component of future studies to validate using UDL specifically as an engagement framework.

An additional benefit of increased engagement of disengaged learners in UDL courses was the awareness teachers developed of their strategies. Teacher F was thoughtful about how students perceived the tasks she assigned. She felt that her traditional methods lacked the necessary component of interest. An element of interest is important to grab the attention of students who might not have strong self-regulation in starting tasks they view as boring or irrelevant. Teacher H also noted a definite increase in engagement with the strategies she chose for her UDL course compared to the non-UDL course. Successful UDL strategies impacted teachers' future use of the same strategies. Many teachers used the strategies immediately in other courses, and every teacher made plans to utilize UDL strategies in the upcoming year. In teacher reflection of the success of UDL on engagement, one theme emerged as both a catalyst and a barrier to student engagement as a whole.

This study's time of year was beneficial, because the teachers were in tune with their students and knew who needed more support. Some teachers chose struggling classes as their UDL classes because they had plenty of time to determine which classes truly needed that support. Self-efficacy is built upon positive experiences, and both teachers and students increased confidence levels in this study. Struggling students could access material in ways that provided them success through increased engagement in learning tasks, as suggested by teacher observation, student participation, and student completion of tasks. Teachers saw the effectiveness of UDL in reaching struggling learners and found relief in simple strategies from which all learners can benefit. Better

strategies enhanced teaching by increasing teachers' strategies to reach a challenging subset of students.

It must be noted that the time of year was also a barrier to more accurate results. One of the instructors indicated that timing was likely a barrier to success for the classes, because it was so late in the school year. For this instructor, the lateness in the year translated into a lack of effort on behalf of students. However, another teacher attributed late-year activity-related absences as a negative factor.

It must be emphasized that teachers should start early in the year and be consistent with implementation. Several teachers mentioned this suggestion when they considered barriers to implementation. Early implementation creates consistency for students regarding expectations. It would also help increase the depth of the study by providing more data over numerous units. However, training teachers in co-constructing choices and giving space for students' voices could also improve these outcomes.

For instance, Teacher G indicated that the students had asked for a particular activity, and she denied that request to keep the assessment more structured. However, she noted in the interview that engagement would have increased if she had allowed that option. This instructor's reflection indicates deep learning of the UDL principles and demonstrates the efficacy of the training, which will be discussed in the results for Research Question 7. However, these reflections show areas of improvement that could have been made in training for future support of instructors looking to implement UDL.

Teacher G's reflection regarding the lack of engagement in a particular task as teacher error also demonstrates the importance of a growth mindset for teachers when

embarking on UDL. Teachers might offer a choice that fails to hook students. There must be space for teachers to find what works without feeling defeated.

Research Question 4

RQ4- What benefits do teachers see, if any, of using UDL in the classroom?

Every teacher in the study listed multiple benefits of using UDL. Teachers who felt that UDL was better for students noted increased learning (3 responses), increased engagement (5 responses), specific help for struggling learners (3 responses), student strengths optimized (3 responses), increased creativity (3 responses), and increased enjoyment of the content (2 responses). These benefits coincide with the skills Borba (2021) and Doubet (2021) noted, as discussed in Chapter One, as essential to help graduates thrive: the ability to persist, communicate, be creative, and set goals. Teachers were pleased with the results of using UDL in their classrooms and planned to use the strategies the following school year, even teachers who indicated that engagement between the two UDL and non-UDL were similar. These mastery experiences increase efficacy for both teachers and students.

Perhaps the most significant benefit for teachers was the awareness of the variance of their learners and their mindsets regarding learners, especially those that are disengaged. Teachers could positively impact learning gaps through their mindsets. Teachers revealed their positive mindsets through their recognition that UDL had value in reaching students because disengaged students re-engaged and students in UDL classes, even lower performing classes, were at least similarly engaged, if not more than, the students in non-UDL courses. Additionally, teachers were reminded of or were

newly aware of what choice can do for students and how offering support for all learners can benefit their engagement.

Teachers indicated surprise at the effectiveness of collaborative choice in tasks and the creativity that previously identified disengaged learners employed to complete tasks. They found effective ways to support struggling learners, provide feedback to more learners per class period, and engage both struggling and advanced learners simultaneously. These successes impacted future strategies teachers put into place in their units of study. Better teaching leads to better learning.

Perhaps the most telling benefit of UDL was seen in the growth mindset of teachers regarding not only the students' abilities but of their abilities in reaching those students. These results are discussed further in this chapter's discussion for Research Questions 6 and 7. These benefits indicated the effectiveness of the strategies as well as the training over UDL and the practice of using those strategies. However, there were also barriers in the study that teachers noted thwarted their effectiveness and would impact future studies or implementation of UDL.

Research Question 5

RQ 5- What barriers do teachers see to implementing UDL in the classroom?

The barriers to UDL implementation that teachers listed offered insight into the training of teachers and support for teachers throughout the implementation process. Teachers cited student absences (2), time to prepare (3), time of year (4), space (1), too many options (2), lack of understanding (2), resources (2), lack of collaboration (2), teacher mindset/self (4). Some of these barriers also revealed issues that could be addressed in later studies.

Student Absences

Student absences were a barrier to implementation. Teacher E noted that her engagement problem in a particular class stemmed from student absences. Teacher D experienced similar issues, with one group of students missing an entire week, due to a school-related event. Teacher G, however, had planned for absences in advance by offering "after-school opportunities" or choosing an option that would allow them to catch up at home. Part of these absences could be blamed on the time of year. The school-related absences involved performances, sports competitions, and project-based activities outside the building. While these are beneficial experiences for students, they affect classroom learning. Teacher D had given a quiz with almost 20 students absent. She indicated that the high number of absences had affected engagement.

Working with sponsors of events that pull students from class to set expectations for catching up in missed classes could benefit both teachers and students. Additionally, having teachers like Teacher G model and share their ideas for offering options for students who missed work would build efficacy for teachers who might feel overwhelmed or frustrated with student absences. For future studies, beginning the study at the start of the year would allow for fewer absences and increased study length. Earlier implementation would give teachers time to prepare instead of trying to plan during the school year.

Time to Prepare

UDL does take the time upfront to think about the barriers learners might face and to develop options to circumvent those barriers. Three teachers suggested that time to prepare or implement UDL effectively could be a barrier. Teacher E explained that

even a small chunk of time, when applied to multiple sections and days, adds up quickly. Teacher D agreed, stating that the amount of time she invested in the planning was more than the time students invested in the learning. Teacher B felt similarly but noted that increased practice in planning and addressing barriers became easier over time.

In response to the time barrier to preparing, teachers were already seeking solutions and suggested that if UDL were implemented in the district, teacher teams and collaboration would be essential. The lack of collaboration was a barrier listed by a couple of teachers. As cited in Chapter Two, collaboration in UDL practice is highly recommended. Teacher C suggested that even one other teacher could share the load by splitting up tasks and unit planning. In agreement, Teacher H pondered the increased number of resources and ideas that a group of like-minded teachers could develop for use across disciplines. Such suggestions would positively impact the implementation of UDL and future studies. After training, collaborative teaming and support could offer further efficacy to teachers in using UDL strategies.

While some teachers who brought up resources did not struggle with finding resources themselves, they were keenly aware that some disciplines might not have the same number of resources available. Being unsure how to offer more active options or station work in a confined classroom can also be challenging. Even with a plethora of resources, time can still be an issue. Collaboration in teams could address this barrier from the standpoint of the cognitive load of the task as well as the time constraints on one person to sift through available resources.

While the district training for UDL suggested working in teams, this is not always plausible for singleton departments where there is only one teacher (or only one teacher

interested in implementing UDL). Districts and those interested in more in-depth studies can support this request by working with PLC teams on implementation, hosting shared planning sessions for interested teachers, and curating resources by grade level and content. Building capacity in teachers to become UDL leaders in their budlings could provide a point person to support individual teachers or teams.

Time of Year

As addressed in the limitations and validity issues of this study, the time of year the study took place was considered a barrier to some teachers, and rightfully so. Beginning new strategies at the start of the year or even the start of a semester would be better than implementing them in the last quarter. Future studies should encompass an entire school year to glean the most accurate results in student achievement, engagement, and the success of strategies.

However, the benefits of having the study later in the school year showed that UDL is effective. Even though the study occurred in the fourth quarter of a pandemic year, the results were still positive. Teachers saw benefits, witnessed increased engagement of disengaged learners, had low-performing classes keep up with high-performing classes, and found successful strategies they were excited to implement the following school year. Even with limited time, even teacher mindset was positively affected.

Teacher Mindset/Misunderstanding

Reflective teachers identified their misunderstandings and practices as barriers that decreased their efficacy of using UDL strategies. Teacher G reflected that she was her own barrier and that through evaluation of her strategies, she found her mindset often

limited her perspective of effective strategies or students' capabilities. While two teachers felt that they created their barriers through a lack of understanding or offering too many choices, others felt that teachers sometimes did not want to try new things. Teacher A said that teachers might balk at the suggestion of UDL, viewing it as another task to complete on top of the plethora of daily tasks teachers tackle. These issues can be addressed through improved UDL training.

District training and teacher support can be improved by referencing the idea of too many choices, something the current training did not address. Further, researchers or districts implementing UDL could help teachers develop a structured implementation plan that gradually increases choices to best support both time-related constraints for teachers and learning barriers for students. Future studies could be improved by limiting the choices teachers can choose in UDL units and setting a minimum length for units to be included in the study.

After district UDL training, Teachers corrected some of the barriers they had noted as initial misunderstandings. Teacher A indicated that she had confused UDL with Differentiated Instruction until the training. Teacher G said she first thought UDL was just about offering choices. Through exposure to training, awareness of learner variance and UDL principles, and increased practice, teachers honed their skills and became even better practitioners.

Research Question 6

RQ6- How does UDL training impact teachers' perceptions of students' ability to change factors related to school engagement and academic performance?

Research Question 6 data were collected from Survey Question 3 within a *Qualtrics* survey containing six Likert-type questions that addressed how teachers perceived students' ability to change the following: how much talent they have, how much effort they put forth, how well they behave, how much they like the content of a class, how easily they give up, and their intelligence. Overall, the growth in the mindset of teachers regarding students was positive.

Teachers improved their perception of how much students could change their talent level, believing after the unit that it was somewhat or quite possible. Reviewing the key highlights of these changes from Chapter Four will help break down the results later in this section. One of the most significant changes was the perception of students to change their level of effort, with all teachers believing it was *quite* or *completely possible*. How much students liked the course content, how easily they gave, and how much they could improve their intelligence also steadily improved in all positive categories, leaving no teachers to believe that students could not change in these areas. This is significant because some teachers moved from believing that it was only a *little possible* for students to change in these areas to believing students had greater control in these areas. The intelligence category offered the most growth in a favorable area (*somewhat possible to change*) and supported the research of Willingham (2009) in Chapter Two. The area of behavior was the one area that dropped in a positive category and gained in a lower category (from *somewhat possible* to a *little possible*) but simultaneously grew in the highest category. The *completely possible to change* category grew by 25% and was the only category with that level of growth in the most *completely possible* category.

The beliefs about students in the categories of behavior, intelligence, talent, etc., shape teachers' expectations of how students can and will perform and, as presented in Chapters One and Two, influence the actions of teachers and the work being assigned. Teachers in this study already believed that students had some control over the areas presented in this question, because zero teachers chose the category of *Not at all possible to change* for any statement. Still, there was growth in mindset in every category regarding students' abilities. This growth can lead to better relationships, higher-level work, and ultimately better student outcomes. The overall growth indicates that training and practice successfully empowered teachers to use strategies that promoted student engagement.

The confidence in students' abilities was reflected in interviews with teachers. Teacher B said that partner work kept disengaged students motivated. She further explained, "Many times when you allow them to work in groups, they're not really working, but we could hear the conversations they were having." Teachers reported being impressed with student work. Teacher H felt that struggling and disengaged learners could find support and create an exciting product for the assigned tasks, emphasizing, "I was surprised at what my weaker students gave me." Two teachers co-created assignments with their classes, where teachers provided the structure, but students could create whatever they wanted to demonstrate their learning within the structure provided. Both teachers were impressed with what the students produced.

Behavior

The category of behavior dropped by 11%, moving from *quite possible to change* to *somewhat possible*. As suggested by the MSTA survey data in Chapter Two, behavior

issues were a concern this year. The first question that must be addressed is what is behavior? It was not defined in the question asked to teachers in the survey, which would need to be addressed in future studies. Behavior is a sign of disengagement, but were teachers referencing not turning in work and off-task behavior, or were they considering more aggressive behaviors that were disruptive to learning? Due to the concise nature of the district UDL training course, adding additional information to that course might be too overwhelming for participants. However, addressing behavior through PLC discussions could be beneficial. Coaching conversations during PLC meetings could provide teachers with tools to redirect and empower students to overcome behavioral engagement issues. Building administrators could also collaborate with teams to consider what students or classrooms might need assistance with more aggressive behaviors.

Intelligence

The category of intelligence dropped from the quite possible to change by 2.8 %. While there was growth in this category overall, neither the category of intelligence nor the category of talent had any responses in the *completely possible to change* category pre- or post-unit survey. This is disappointing because these two categories can significantly influence the types of assignments assigned to students, the rigor of work assigned to students, and the trust in students to co-create or develop their own assessments, as presented in Chapter Two. When teachers referenced disengaged students who failed to reengage, teachers indicated that those students would not change or that they did not expect them to change.

The district can counter these beliefs through professional development efforts, explicit expectations with support for assigning grade-level work, and UDL implementors sharing their students' successes. Seeking students' voices could help equip teachers with the background information they need to develop stronger relationships and pedagogy relating to students who might face challenges in learning.

Research Question 7

RQ7- How does UDL training impact teachers' perceptions of their abilities to meet students' jagged learning profiles?

Research Question 7 data were collected from Survey Question 4 within a *Qualtrics* survey containing three Likert-type questions regarding teachers' confidence in dealing with variability profiles of unmotivated, most challenging, and most advanced students. Teachers felt the most confidence pre- and post-survey helping advanced learners. This was the only category with growth in the *extremely confident* category. Even the *quite confident* category remained at 55.6%. Supporting advanced students is essential, especially if they are bored and disengaged, because they feel they already know the material. However, based on teachers' comments regarding their struggling and disengaged learners, these students were not the target students in the participating classes.

Teachers had the most growth in confidence in helping challenging students learn, with the category of *quite confident* by 44%. They also had increased confidence in assisting unmotivated students with growth in the *somewhat* and *quite confident* levels. Teachers' development in these areas was reflected in the interviews. Teacher C

stated, “I noticed certain kids who normally don’t care--a couple of them, since they got to pick, seemed more engaged.” Teacher C shared the following:

> Oh my gosh, I really wasn't expecting it to go as well as it did, but it did. I have one very, very low-functioning student in the 6th hour, and for her, that's the only way she's going to learn anything is if you can literally walk her through it. She really needs a para or one-on-one, but she doesn't qualify for an IEP. And so, for her, the choice to work with me was the only way to do it. And then there's another girl who struggles quite a bit. They didn't hesitate a bit. They came straight to my table.

As stated in Chapter Two, choices build self-regulation for students and, as one teacher noted, allow them to play to their strengths.

The mastery experiences of teachers in seeing success with UDL strategies not only changed mindsets about learners, as suggested by teachers’ interviews, but these experiences also helped teachers make connections to ineffective practices. Several teachers reflected on past or current strategies that were not quite as effective as they had hoped. Teacher F said there was “definitely more engagement,” noting that the traditional review method she utilized in the non-UDL class was “a little bit boring.” She planned to use more of the non-traditional review method next school year.

Teachers used the experience to think about how to help other teachers be successful in implementation: collaboration, starting small, training students, and being consistent. They noted moments during training or implementation that clicked for them. Teacher A said that in-district training, she realized the support strategies she used for her lowest students were helpful for all of her students. Teacher D said that the success

of new ways to practice helped her realize how much students need options for practice. Every teacher had plans to use UDL the following school year. This forward-thinking reveals a certain level of confidence in moving forward with implementation and nods to the study's success. To ensure these teachers are successful, the building coach should follow up with them at the beginning of the year to brainstorm, answer questions, and offer lesson observation and feedback.

Personal Reflections

As an Instructional Coach for the district, my role is to support teachers in their quest to educate students. Students deserve intentional and dedicated teachers. Teachers believe they are doing what is best for students, and my job is to help them refine practices to best support all learners. Often unintentionally harmful teacher mindsets and practices limit students' success. One of the most frequent complaints I have heard from teachers this year is the lack of engagement on behalf of students. The more I've researched and studied UDL, the more I am convinced UDL can stretch beyond its original boundaries of serving students with physical, cognitive, and learning challenges as a tool to increase engagement for disengaged learners. However, there just was not enough research to support that idea. Even though the tired year was almost over, nine educators agreed to help me determine if UDL could help with engagement issues in the district because they, too, were seeking successful strategies. The study was successful in that UDL increased engagement in previously disengaged students. These students did not have IEPs. There is a lack of research regarding the success of UDL in engaging students outside of special services. I hope this small study can lend hope to more extensive research efforts and begin to bridge the gap in the literature.

Perhaps most impressive was the change in teachers' mindsets regarding students and their confidence levels in helping all students. UDL training and practice positively affected how teachers viewed students and themselves. Teachers shifted their viewpoints about disengaged learners, and negative characteristics of these learners were replaced with positive descriptors. Additionally, teachers' views of their abilities to reach struggling learners increased, and teachers became aware of ineffective strategies. These results are encouraging and could impact future studies regarding UDL as an engagement framework. With that said, many areas of improvement can be made regarding UDL training and the support of teachers considering UDL implementation. The study results indicate that UDL is a useful framework for addressing engagement issues in disengaged learners.

Study Limitations

One of the most critical aspects of genuinely understanding any educational strategy's impact is seeking student input. UDL creates inclusive and equitable learning environments by seeking student voices to co-create learning tasks that are rigorous, grade-level, and engaging (Novak, 2021; Meyer et al., 2014). This study did not include students' voices. Because of the time of the year, it was not easy to allow time for parents to provide consent for all the students involved. Student voice would be imperative to moving forward with UDL strategies.

It was challenging to measure implementation fidelity to ensure teachers used the best UDL practices. The researcher trusted each teacher to use UDL strategies effectively and to the best of their abilities. While each participant participated in training requirements, teachers chose which options to provide students in their UDL groups.

While the researcher did meet with each participant to discuss their plans before implementation, the researcher did not complete observations of classrooms to monitor the introduction and use of strategies.

The research participants included teachers from two intermediate schools, one middle school, and one high school in the participating district. Only nine teachers responded, and eight of those teachers were at the high school level. One teacher was at the middle school level. Therefore, the study focused on secondary teachers and did not encompass lower grades from the intermediate grade levels, fifth and sixth grade. Given the size of the study and the convenience sampling used from the researcher's place of employment, the results of this study validated experiences within the research district specifically, and the results did not apply to other school districts as *generalized* research outcomes. Larger-scaled research studies are necessary to validate any of these findings.

Part of the low participation could be attributed to the time of year in which the study began, nearing the beginning of the fourth quarter, when teachers focus on state testing requirements. Additionally, this study occurred during year three of a national pandemic attributed to Covid-19. These factors might skew student engagement and teacher fidelity of implementation.

Recommendations

This study demonstrated that UDL could increase engagement in students who had been previously identified as disengaged. It cannot be determined if UDL impacts student scores because the quantitative data showed similar scores between UDL and non-UDL classes. Every teacher in the study saw increased engagement in disengaged students, the UDL class as a whole, or both. Teachers indicated several benefits to using

UDL, and every teacher had a plan for using one or multiple strategies in the upcoming school year. The positive impact on teacher mindset, student re-engagement, and engagement as a whole, suggests that UDL could greatly improve teaching practices. Teachers in the study were more aware of their strategies from a student perspective and saw the value of choosing more autonomous structures in various lesson stages. Students responded positively to these autonomous structures by demonstrating increased on-task participation and, in some cases, increased completion rates of assigned tasks.

Additionally, the size of this study and the fact that it was designed around a convenience sample of teachers limits its application beyond the district where the study was completed. Below are recommendations for UDL implementation in the district, in other districts considering UDL implementation, and for further research.

Recommendations for Districts Implementing UDL

I recommend that districts encourage UDL training for teachers, especially new teachers. UDL training should address UDL practices beyond choice, as this was a hazy area in training offered in this study. District instructional coaches and teachers who feel confident in the UDL practices can support teachers embarking on the journey. Encouraging UDL as a framework that lives inside PLC processes can help alleviate views of "one more thing." If teachers see that UDL can increase engagement, they might be more willing to implement it, especially if practicing teachers would be willing to share their students' successes. UDL has other benefits, too, since it helps everyone find success in inclusive environments. Continuing inclusivity training regarding belonging and the negative impact of deficit approaches and labeling on students is essential to counter the belief that some students cannot do the work because of

perceived rigid intelligence or talent. Lastly, seeking the input of disengaged learners could impact educators far beyond district professional development. Understanding learning from the student perspective could empower educators to provide more autonomy in learning, which might revive the curriculum and improve the learning environment.

Recommendations for Future Research

This study demonstrated that UDL could increase engagement in students who had been previously identified as disengaged. It cannot be determined if UDL impacts student scores because the quantitative data showed similar scores between UDL and non-UDL classes. The size of this study and the fact that it was designed around a convenience sample of teachers limits its application beyond the district where the study was completed.

Future studies would want to make several adjustments to develop an understanding of the success of UDL on engagement.

1. The first recommendation is to begin the study at the start of the school year to allow teachers time to train students in the idea of choices and to build upon why students might use one strategy over another. Beginning the study at the start of the school year allows for more units of study to be included in the research and more student achievement data to be collected.
2. The second recommendation is to learn more about what the students' teachers perceive as disengaged. Two options would have increased the depth of this study: A) Use the Student Information System to determine the gender, race and ethnicity, socioeconomic status, IEP status, and English

Language status of each student. Such information could shed light on the curriculum or learning delivery. What choices worked with subsets of disengaged learners, and what trends are present regarding those that did not reengage? B) Seek student voices through surveys or panel discussions to learn what they think about school if they perceive themselves to be disengaged, and what methods would encourage them to engage.

3. Define “behavior” in the Panorama survey question, so everyone knows the definition and situations in which student behavior is applied.
4. Observe participants’ classrooms and gauge if students are engaged. Visit with students, look at work samples, and look for the principles of UDL in the lessons.
5. Track the participants' Likert scale questions and follow up with them regarding the reasons behind their answers or include a space on the survey for them to do so.
6. Lastly, expand to more grade levels beyond secondary to develop a broader range of impact and reference.

Recommendations for Teachers Wishing to Implement UDL

Every teacher in this study indicated they thought UDL was beneficial, increased student engagement, and impacted the effectiveness of their teaching. Teachers who want to implement UDL into their classroom should expect to be challenged about learner variability and traditional teaching methods. Per the recommendations of teachers in this study, any teacher wishing to implement UDL might consider the following:

1. Learn about UDL and Learner variance through CAST, the work of Dr. Katie Novak and Todd Rose. Understanding learners in our classrooms and effective ways to reach the most learners is important.
2. Work with a partner or a team to reduce planning time around addressing barriers and increase resources through sharing.
3. Start slowly at the start of the school year to build consistency for students, develop their skills in tracking their progress, and choose the best approaches to learning.
4. Limit the number of choices offered to students in tasks to encourage engagement.
5. Try strategies more than once and try more than one strategy. Teachers in this study indicated they had to be more reflective and open to trying new things.
6. Seek the feedback of learners. Research indicates the importance of the learner's voice. Ask students to co-create some options and seek their feedback about strategies. Teachers in this unit found success when co-creating tasks and asking for student feedback.

Conclusion

The results of this study are mixed. While the use of UDL did not show a difference in the increase in student scores from pre- to post-unit, there were positive results from training and the use of UDL in classrooms. Teachers saw increased student engagement and participation, increased enjoyment of content from students, increased mindsets regarding students, and increased confidence in their abilities to help all

learners. Teachers expanded their strategies to meet student needs by using various methods within the three main principles of UDL. Furthermore, every teacher indicated their intent to continue using those practices the following year.

These positive outcomes suggested that UDL can provide educators with tools to counter the learning gaps students face and increase engagement in all students. While deficit mindset issues continued to linger regarding the variance of learners with regard to the malleability of intelligence, the overall growth demonstrated by the participants in this study was positive. UDL training was beneficial for educators in this study because it challenged ideas about learner variance and provided explanations of the UDL principles and examples of those principles in the classroom. Training and practice challenged misconceptions about choice, use of strategies often reserved for learners with IEPs, and confusion around Differentiated Instruction in relation to UDL.

Teachers felt they used better teaching methods when reflecting upon their UDL strategies. These positive experiences culminated in a growth mindset around their abilities to reach struggling and disengaged learners. Likewise, their perception of disengaged students improved as students found ways to access material using their strengths. These results lacked the voice of those at the center of the discussion, which is ironic. A study aimed to give students more voice did not include those voices. More research on UDL practices should be done with student voices at the center of the study to further the absence of research on UDL as an engagement framework.

While the size of this study limits its application beyond the participating school, the results provide a positive implication for bigger studies with a broader scope of participants. Universal Design for Learning is a successful framework. This study

demonstrates its success in reaching students outside the scope of special services for which research is lacking. Whatever teachers can do to close learning gaps through increased engagement in the challenging post-Covid classroom is a must. UDL has the potential to empower both teachers and learners to reach a shared vision of success.

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Appendix A: Informed Consent Form

LINDENWOOD

Research Study Consent Form

The Effect of UDL on Student Engagement and Achievement in a

Southwestern School District

You are asked to participate in a research study being conducted by Amber Hainline under the guidance of Dr. Jackie Ramey at Lindenwood University. Being in a research study is voluntary, and you are free to stop at any time. Before you choose to participate, you are free to discuss this research study with family, friends, or a physician. Do not feel like you must join this study until all of your questions or concerns are answered. If you decide to participate, you will be asked to digitally sign this form.

Why is this research being conducted?
We are doing this study to determine the relationship, if any, of Universal Design for Learning (UDL) on student engagement and achievement in the secondary setting. We will be asking all participants to answer these questions.

What am I being asked to do?
Participants will be asked to complete a three-part Universal Design for Learning module in Canvas, which can count toward district I.E or DGH hours.

- Upon completion of this learning, participants will be asked to choose and identify two like courses for an upcoming unit of study.
- Participants will be asked to include UDL procedures in all phases of the lesson in one of the courses.
- Participants will be asked to track students' pre- and post-unit scores in the chosen classes in a spreadsheet provided by the researcher.
- Participants will be asked to complete a survey before the unit and after the unit, and participate in a brief interview with the researcher. .

How long will I be in this study?

One unit of study, approximately 2-6 weeks, not including the time for you to complete the UDL modules in the District Vault in Canvas.

What are the risks of this study?

Privacy and Confidentiality
We are collecting data that could identify you, such as survey data and student scores associated with your course. Every effort will be made to keep your information secure. Only members of the research team will be able to see any data that may identify you.

What are the benefits of this study?

You will receive no direct benefits for completing this survey. We hope what we learn may benefit other people in the future.

Will I receive any compensation?
There is no compensation for this study outside of voluntarily turning in hours for the UDL learning modules for district compensation, which is open to all teachers regardless of participation in this study.

What if I do not choose to participate in this research?

It is always your choice to participate in this study. You may withdraw at any time. You may choose not to answer any questions or perform tasks that make you uncomfortable. If you decide to withdraw, you will not receive any penalty or loss of benefits. If you would like to withdraw from a study, please use the contact information found at the end of this form.

What if new information becomes available about the study?

During the course of this study, we may find information that could be important to you and your decision to participate in this research. We will notify you as soon as possible if such information becomes available.

How will you keep my information private?

We will do everything we can to protect your privacy. We do not intend to include information that could identify you in any publication or presentation. Any information we collect will be stored by the researcher in a secure location. The only people who will be able to see your data are: members of the research team, qualified staff of Lindenwood University, representatives of state or federal agencies.

How can I withdraw from this study?

Notify the research team immediately if you would like to withdraw from this research study.

Who can I contact with questions or concerns?

If you have any questions about your rights as a participant in this research or concerns about the study, or if you feel under any pressure to enroll or to continue to participate in this study, you may contact the Lindenwood University Institutional Review Board Director, Michael Leary, at (636) 949-4730 or mleary@lindenwood.edu. You can contact the researcher Amber Hainline directly at 417-742-3524 ext. 4309 or AH164@lindwood.edu. You may also contact Dr. Jackie Ramey at jramey@lindenwood.edu.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above.

By clicking the button below, you acknowledge:

- Your participation in the study is voluntary.
- You are at least 18 years of age.
- You are a certified teacher in a regular education classroom teaching grades 5-12.
- You are willing to take a UDL course which can be counted for 3 hours toward professional development pay through district growth hours or instructional excellence hours.
- You are willing to use UDL strategies in one section of a course in which you teach at least two sections.
- You are aware that you may choose to terminate your participation at any time for any reason.

○ I consent, begin the study

Appendix B: Pre-Unit Survey

Please list the first initial of your first name and your full last name, so the researcher can follow up with you for an interview and UDL study information. This information will not be included in the published study.

How long have you been teaching?

1-5 years

6-11 years

12 or more years

For this study, you will be asked to use UDL strategies in one unit for one class, but not use the strategies in a different section of the same class. (For instance 4th grade math during 3rd hour and 6th hour or English I, 2nd hour and 4th hour.) Please list which class you are choosing to participate in this study.

How do you know students are engaged in a lesson? What would you see and hear students doing?

How do you know students are disengaged in a lesson? What would you see and hear students doing?

Q3

Whether your students do well or poorly in your class may depend on many different factors. Some of these factors might be easier for your students to change than others. How possible do you think it is for your students to change:

	Not at all possible to change (1)	A little possible to change (2)	Somewhat possible to change (3)	Quite possible to change (4)	Completely possible to change (5)
How much talent they have	○	○	○	○	○
How much effort they put forth	○	○	○	○	○
How well they behave in class	○	○	○	○	○
How much they like the content in your class	○	○	○	○	○
How easily they give up	○	○	○	○	○
Their intelligence	○	○	○	○	○

Q5

Please answer the following questions regarding your confidence in dealing with the following variability profiles of students below:

	Not at all confident (1)	Slightly confident (2)	Somewhat confident (3)	Quite confident (4)	Extremely confident (5)
How confident are you that you can engage students who typically are not motivated?	○	○	○	○	○
How confident are you that you can help your school's most challenging students to learn?	○	○	○	○	○
How confident are you that you can meet the learning needs of your most advanced students?	○	○	○	○	○

Appendix C: Post-Unit Survey

Please list the first initial of your first name and your full last name, so the researcher can follow up with you for an interview and UDL study information. This information will not be included in the published study.

Q3

Whether your students do well or poorly in your class may depend on many different factors. Some of these factors might be easier for your students to change than others. How possible do you think it is for your students to change:

	Not at all possible to change (1)	A little possible to change (2)	Somewhat possible to change (3)	Quite possible to change (4)	Completely possible to change (5)
How much talent they have	○	○	○	○	○
How much effort they put forth	○	○	○	○	○
How well they behave in class	○	○	○	○	○
How much they like the content in your class	○	○	○	○	○
How easily they give up	○	○	○	○	○
Their intelligence	○	○	○	○	○

Q5

Please answer the following questions regarding your confidence in dealing with the following variability profiles of students below:

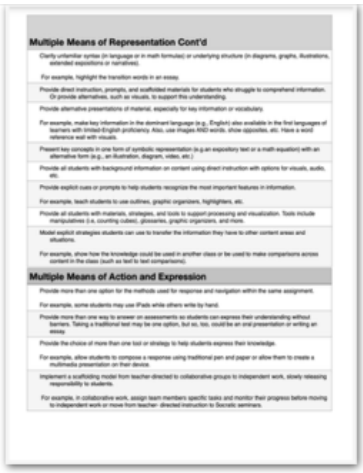
	Not at all confident (1)	Slightly confident (2)	Somewhat confident (3)	Quite confident (4)	Extremely confident (5)
How confident are you that you can engage students who typically are not motivated?	○	○	○	○	○
How confident are you that you can help your school's most challenging students to learn?	○	○	○	○	○
How confident are you that you can meet the learning needs of your most advanced students?	○	○	○	○	○

Appendix D: Interview Questions and Resource

UDL STRATEGIES from CAST Guidelines

Multiple Means of Engagement

Multiple Means of Representation



Multiple Means of Representation Cont'd

Multiple Means of Action and Expression

Multiple Means of Action and Expression

Referencing the UDL strategies list above, please explain what UDL strategies you used in your unit for the section of the course in which you used the UDL Framework.

Compared to students who did not receive instruction with the UDL framework, were students who received the UDL unit

- More engaged
- Similarly engaged
- Less engaged

Of the students you selected as disengaged in both sections, what are your perceptions of engagement levels of those students in both courses. Did UDL have an impact on student engagement or not? What leads you to this conclusion?

After using UDL, do you feel there are benefits to using the UDL framework to engage students and increase outcomes? If so, what are those benefits? What leads you to this decision?

What barriers to implementation of UDL do you foresee?

Appendix E: Deidentified Table Example

Directions for Student Column	Directions for Scoring Columns	Directions for Sharing Document
This tracking sheet is a data collection sheet for a dissertation. The information on this sheet will not be shared with anyone besides the instructor completing the data and the researcher. For your ease in keeping tracking organized, **you may add student initials to the Student Column. Delete this column before sharing the document with the researcher at the end of your unit.** Leave the Student Coded column.	**Grades 5-8:** You may add columns to the document if you are tracking more than one standard in a unit. You can list the standard code at the top to differentiate. The researcher will use the Marzano conversion scale to convert profiency scale scores to a 100 point scale for consitent data comparison. **Grades 9-12:** Put in the overall percentage based on the high school 100 point grading scale. You will not need to track standards.	At the end of the unit, delete the Student Column from Class A and Class B spreadsheets (Column A). Do **NOT** delete the Student Coded ID column B. Click on the green share button in the upper right corner and share with amberhainline@willardschools.net. The researcher will send you a post-unit survey link (2 questions) and an invitation for an interview. The interview will take no more than 20 minutes.

Student (Delete this column at the end of unit). Use initials, not entire names	Student Coded ID	Do you perceive the student to be disengaged?	Does the student have an IEP? (Y/N)	Pre-Unit Score	Post-Unit Score
	A.1				
Delete this column before sharing with researcher	A.2				
	A.3				
	A.4				
	A.5				
	A.6				
	A.7				

Add columns as needed for multiple standards

Appendix F: Permission to Use Panorama Survey

Our Story

We come to work every day because we want to make a difference in the lives of all students. We started this work as students ourselves, promoting student voice in school improvement conversations. Today, we proudly support over 13 million students in 21,000 schools, 1,500 districts, and 50 states.

Over the past nine years, we have seen how data play a powerful role in improving school climate and culture, teaching and learning, family and community engagement, and students' social-emotional learning. We believe in supporting schools and districts from beginning to end—from administering surveys and conducting data analysis, to providing hands-on coaching and support.

Because we believe that all students deserve the highest-quality education, we've made all of our research-backed survey instruments open-source and free for educators to use. We'll continue to share the best practices we learn from the innovative schools and districts we support.

We're committed to widening our perspective on what matters for students and for school success. We've since created the team and the company to do it, and we call ourselves Panorama.

Appendix G: School Site Permission Letter

Eric Wilken, Ed.D. Assistant Superintendent
Shane Dublin, Ed.D. Assistant Superintendent
p: 417.742.2584
f: 417.742.2586

500 Kime, Willard, MO 65781
www.willardschools.net

WillardPublicSchools

Feb, 2, 2022

Institutional Review Board
c/o Office of Research Compliance
209 S Kingshighway
St. Charles, MO 63301

Dear IRB Members,

After reviewing the proposed study, "The Effect of UDL on Student Engagement and Achievement in a Secondary Setting", presented byAmber Hainline, a graduate student at Lindenwood University, I have granted permission for the study to be conducted at Willard Public Schools, Grades 5-12..

The primary purpose of this study is to investigate, through a mixed methods approach, if teachers applying Universal Design for Learning to a unit of study note increased engagement in students who teachers identified as disengaged compared to students in a same unit of study without Universal Design for Learning methods. Additionally, this study seeks to determine if students in an UDL course have greater achievement than students in a same unit of study without the UDL framework applied. The goal of this study is to determine if UDL will benefit the students at the participating school, particularly those students not utilizing special services.

I understand that the study will occur in the spring 2022 for one unit of study (2-6 weeks) during normal classroom instruction in two classes under each of participating teachers. I expect that this project will end no later than May 20th, 2022..

I understand that Mrs. Hainline will receive consent for all teacher participants, who may opt out of the study at any time. Mrs Hainline has agreed to provide to my office a copy of all Lindenwood University IRB-approved, stamped consent documents before she recruits participants on campus. Any data collected by Mrs. Hainline will be kept confidential and will be stored in password protected digital files.

If the IRB has any concerns about the permission being granted by this letter, please contact me at the phone number listed below.

Sincerely,

Shane Dublin, Assistant Superintendent
Willard Public Schools

Appendix H: Recruitment Letter

Hello teachers,

My name is Amber Hainline, and I am an Ed.D student at Lindenwood University working on my dissertation study: *The Effect of Universal Design for Learning (UDL) on Student Engagement and Achievement in a Secondary Setting*. The primary purpose of this study is to:

- investigate if Universal Design for Learning (UDL) strategies, when used in a unit of study, increase engagement and achievement in students identified as "disengaged" compared to students in a same unit of study without UDL methods applied.
- ascertain if UDL will benefit the students at the participating school, particularly those students ***not*** utilizing special services.

If you agree to participate in this study, you will be asked to do the following before April 15th, 2022:

1. Complete a UDL professional learning course in Spark which can be counted for IE/DGH hours (3 hours).
2. Complete a *Qualtrics* survey before the unit (seven questions) and after the unit (two questions).
3. Apply UDL strategies to <u>one</u> upcoming unit of your choosing in <u>one</u> course (the building instructional coach can collaborate with you on this aspect). In addition, you must teach one other section of the same course in which UDL strategies will not be utilized to compare student achievement and engagement.
4. Complete a spreadsheet for your classes with pre- and post-unit scores.
5. Complete a 20-minute interview with the researcher after the unit.

I know it is a grueling year, and I want this process to be easy, informative, and helpful to you as an educator. If you would like to see a quick example of what UDL strategies include, you may look at these resources:

- <u>UDL Teachers Guide</u>
- <u>UDL Strategies List</u>

If you are willing to participate in this study, please complete the first survey by clicking on the link below. The survey will serve as your consent form for participation in the study. I appreciate your valuable time and assistance!

https://lindenwood.az1.qualtrics.com/jfe/form/SV_9LJ5wEPVSBvXba6

Thank you for your willingness to consider participating!

Amber Hainline

Vitae

Amber Hainline graduated with her Master's degree in English from Missouri State University in 2000 with an emphasis in British Literature and Composition Theory. She worked as a graduate teaching assistant for Missouri State University from 1998-2000. She carries a Career Certification in grades 5-12 English Language Arts. She began her career in education as an English Adjunct for Front Range Community College and continued to adjunct for Drury University until she began teaching in K-12.

Since 2009, she has served Willard Public Schools as an English Instructor and, most recently, an Instructional Coach at the secondary level. She develops professional learning experiences for teachers, supports classroom instruction, and leads teams through curriculum development. She anticipates graduating with her Doctorate in Instructional Leadership from Lindenwood University in December 2022.