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What Books Don't Tell You: Teacher-Eye-View of Universal Design for Learning and the Implementation Process

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LOYOLA UNIVERSITY CHICAGO

WHAT BOOKS DON'T TELL YOU:
TEACHER-EYE-VIEW OF UNIVERSAL DESIGN FOR LEARNING
AND THE IMPLEMENTATION PROCESS

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL OF EDUCATION
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF EDUCATION

PROGRAM IN CURRICULUM AND INSTRUCTION

BY

MARYLOU HATLEY

CHICAGO, ILLINOIS

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DEDICATION

I dedicate this to my Lord and Savior, Jesus Christ, who is my life-counselor. He has provided me with strength, guidance, patience, love, and perseverance. During times of frustration, a bent knee was all I needed.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
LIST OF TABLES	x
LIST OF FIGURES	xi
ABSTRACT	xii
CHAPTER I: BACKGROUND AND INTRODUCTION	1
Inequity in American Education	2
New World: Through the 17 th Century	2
Religious Influences on Education Laws	2
Illiteracy Abounds: New Leaders, New Educational Focus	4
Eighteenth Century: The Intellectualism Influence	4
Education in the Nineteenth Century	5
Economic Depression Leads to Literacy Ultimatum	6
Monies to Educate Individuals with Disabilities	7
Twentieth Century: Public Education for Children with Disabilities	9
Government Defines Remedial Programs	10
Great Depression: Placement in Special Classes Increases	11
Reforming Education	11
Civil Rights Cases: Sweeping Changes	12
Legislation to Equalize Educational Opportunity for All	13
Legal Decisions to Support Individuals with Disabilities	14
Legal Changes in General Education	16
Two Streams, Same Goal: Student Achievement	17
Brain Research and Theory Related to Learning	18
Brain Networks Related to Vygotsky's Theory	19
Supporting the Network Triad	21
Universal Design for Learning	22
Basis of Universal Design for Learning	23
Implications for the Teaching and Learning Process	23
Tools to Examine Change	24
Concerns-Based Adoption Model	24
CBAM Stages of Concern	25
CBAM Innovation Component Checklist	28

CBAM Level of Use	29
Systemic Change.	29
Concord's Seven Steps to Systemic Change to UDL	30
Response to Intervention, Positive Behavioral Support, and Systemic Change	33
Statement of the Need	34
Research Questions	35
Significance of Study	36
Proposed Method of Study	39
Summary	39
Organization of Paper	39
CHAPTER II: LITERATURE REVIEW	41
Summary of Inequity in Education	41
Historical Perspective	41
Legislation to Support Equal Opportunity	43
Universal Design Applied to Learning	45
The Development of Universal Design for Learning	45
UDL: The Barrier-Buster	46
UDL and Brain Research	48
Brain Research and the Learning Process	48
UDL Principles Related to Brain Networks	50
The Research Literature	52
Technology and UDL	52
Technology in Education	53
Applying UDL Principles	59
Systemic Change and UDL	59
Summary	61
Rationale	62
CHAPTER III: RESEARCH METHODOLOGY	63
Statement of Problem	63
Overview	64
Methodology	65
Rationale	65
Rationale for Observation Component	65
Rationale for Interview Component	66
Rationale for Survey Component	66
Participants	67
District Demographics	67
Observation and Interview Participants	68
Survey Participants	69
Materials	69
Part One: Observation and Interview Materials	69
Part Two: Survey Materials	71

Procedure	72
Part One: Observation and Interview Procedure	72
Part Two: Survey Procedure	75
Data Analysis	76
Data Analysis of Part One: Observations and Interviews	76
Data Analysis of Part Two: Survey	78
CHAPTER IV: RESULTS	80
Part One: Classroom Observations and Interviews Results	81
Classroom Observations	82
Interview Coding	85
Teacher Interviews: Analysis and Interpretation	93
Knowledge of UDL	93
Emotional or Personality Factors	95
Inter-relationships	97
Action	99
Obstacles	100
Outcome of Use	102
Support for UDL	103
Job Requirements	105
Paradigm Shift	106
Code Lens of Systemic Change	107
Administrator Interviews and Systemic Change	108
District Vision	109
Infrastructure Influences	111
Internal Factors of Stakeholders	115
Interview General Conclusions	118
Part One General Conclusions	119
Part Two: Survey Results	119
Section One: CBAM SoCQ	120
Demographics	120
SoCQ: Highest and Second Highest Concerns by Position	121
SoCQ: Highest Concerns by UDL Implementation Year	125
Part One Connection to Stages of Concern	127
Part Two, Section Two: UDL Survey	129
Demographics of UDL Survey	129
UDL Survey Constructs Results	131
Statistical Analysis of the UDL Survey	136
Individual Participant Agreements	143
Participant P11	143
Participant P6	145
Participant P7	148
Participant P3	150

CHAPTER V: DISCUSSION	152
Findings, Implications, and Preliminary Recommendations	154
What Concerns do Teachers have During the Implementation of UDL?	154
Collaboration	155
Application and Support of UDL	156
Parents and Community	159
Stage of Concern Revelations	160
How Has UDL Influenced Lesson Planning? How has UDL Influenced Lesson Presentation and Student Engagement?	161
What Changes have Taken Place during the UDL Implementation Process? What has Helped Maintain the Change?	164
What Successes and/or Obstacles Do Teachers Encounter During the Implementation Process?	165
Primary Research Question: Discussion	167
Second Research Question - What Systemic Changes Need to Take Place in Order to Implement UDL Principles?	172
Limitations	176
Recommendations	177
Conclusion	180
APPENDIX A: UDL OBSERVATION CHECKLIST	182
APPENDIX B: INTERVIEW QUESTIONS	185
APPENDIX C: SURVEY	187
REFERENCE LIST	193
VITA	201

LIST OF TABLES

Table 1: UDL Observation Checklist Raw Scores and UDL Operative Levels	84
Table 2: Operative Level by Building UDL Implementation Year	85
Table 3: Interview Codebook and Definitions	89
Table 4: Stages of Concern Questionnaire Demographics	121
Table 5: Highest Stages of Concern Profiles by Position	123
Table 6: Tallies of Highest and Second Highest Stages of Concern by Primary Role	124
Table 7: Stages of Concern by UDL Implementation Year	126
Table 8: UDL Survey Demographics	130
Table 9: Levene's Test of Variance	137
Table 10: Tukey HSD: Application of UDL (Q8-21)	138
Table 11: Tukey HSD: Support for UDL (Q25-34)	140
Table 12: Tukey HSD: Personal Reflection	141
Table 13: Pearson Correlations of UDL Survey Constructs by UDL Years of Experience	142

LIST OF FIGURES

Figure 1: Initial diagramming of attributes that influence perception of UDL	87
Figure 2: Visual diagram of codes and themes	92
Figure 3: Stages of Concern Profiles by Position	125
Figure 4: Stages of Concern for Teachers by Year of UDL Implementation	128
Figure 5: Section two survey questions 1-7 focused on general understanding of UDL	131
Figure 6: Questions 8-21 reflect the application of UDL in the teaching and learning process	132
Figure 7: Professional development and training for UDL	133
Figure 8: Survey response results regarding support for UDL	134
Figure 9: Survey questions regarding the impact of UDL	134
Figure 10: Planning and accommodating for individual student needs	135
Figure 11: Teacher personal reflections of UDL influences	136

ABSTRACT

Universal design for learning (UDL) began as an idea to improve access to education for students with special needs and has recently been included in federal educational policy. There is minimal evidence of how teachers perceive UDL or what teachers experience while implementing UDL. This two-part study used qualitative and quantitative methods to examine teacher perceptions of UDL from a single district in a Midwestern state. The study sample varied within each part of the study. For Part One, there were nine classroom observations and teacher interviews, response rate of 30% and 27%, respectively, and two administrator interviews (response rate of 33%). For Part Two, 41 individuals participated in the Concerns-Based Adoption Model (CBAM) Stages of Concern Questionnaire, and 57 participated in the UDL survey, with response rate of 5% and 7%, respectively. Key results showed that some teachers felt UDL had not influenced their teaching and for others UDL was so internalized that it pervaded all areas of a teacher's experiences, teachers understood what UDL was but did not know how to apply UDL in the classroom, nor was UDL viewed as a priority. The perceived level of UDL support varied from building to building and the more experienced a teacher was with implementing UDL, the less UDL was actually demonstrated in the classroom. The question arose as to whether teachers really knew the difference between UDL and just 'good teaching'. A multi-district study which further examines the changes that take

place in the classroom during UDL implementation from inception through advanced implementation years would enhance these results and add to this foundational research.

CHAPTER I

BACKGROUND AND INTRODUCTION

Recent legislature in the United States of America has addressed the need for general education curriculum to be accessible to all students. Federal mandates for the civil rights of individuals with disabilities have existed since the mid-1970s so that many students would be allowed access to public education. The purpose of this study is to present the perspectives of educators who are implementing what is currently thought to be a paradigm-shifting theoretical construct to teacher practices and curriculum development, universal design for learning. Universal design for learning is a framework for designing instructional materials and lessons with the flexibility to accommodate diverse learner needs (Rose & Meyer, 2006). Universal design for learning, by its very design, claims to be an equalizer to accessing general education curriculum.

As protection against any misinterpretation, the writer is noting the following disclaimer: Any seemingly derogatory reference to individuals with disabilities is used solely as a reflection of the mindset and societal labels of the times, particularly in the way society viewed individuals with disabilities. By current standards, the references are considered inhumane and demeaning, and in no way are a manifestation of the mindset of this writer. Care is taken to describe the terms parenthetically in today's terminology.

Inequity in American Education

Inequities in American education date back to pre-colonial times. The structure of educating children has changed over the centuries. Societal expectations and legislature were the catalyst for change, whether in the general education realm or the education of individuals with disabilities.

New World: Through the 17th Century

As the Middle Ages came to an end in the 15th century, its delineations in societal classes, status, and religious influences carried over into the Renaissance Age and eventually into New World education (Kliewer & Fitzgerald, 2001). These societal differences were also reflected in what education, if any, was provided for individuals, including those with disabilities (Kliewer & Fitzgerald, 2001). Many newcomers to America believed that education would help individuals to read the Bible, to advance in wealth and prosperity, to maintain their households, and to compete in the public service or occupations (Brick, 2005; Carpenter, 2004; Cohen, 1973; Issel, 1970; Rayner, 2001; Todd, 1980). Society viewed church heads as the leaders of the communities and knowing the Scriptures necessary to leading a full life. Therefore, reading of the Bible and basic life skills were central to education.

Religious Influences on Education Laws

The religious foundation of education set strict parameters for males and females, with only a few laws impacting the education of those identified then as *mad or crippled*, currently described as individuals with emotional, behavioral, or physical disabilities (Cohen, 1973; Kliewer & Fitzgerald, 2001; Todd, 1980). During this time period,

individuals who were deemed *mad or crippled* had impairments that society could see, whether manifested in a physical anomaly or a neurological impairment that resulted in non-conforming behaviors. These individuals were outwardly different than others, and considered uneducable. Early New World settlers in some communities believed that individuals with disabilities were possessed by the devil and thus, practiced infanticide, burning, and lynching (Scheerenberger, 1983). Even in communities that were more benevolent, where they believed that each person had an intrinsic worth to the community, individuals with disabilities were rarely considered educated (Kliwer & Fitzgerald, 2001). Parents in the New World were responsible for any education a child received, but over time, many parents became negligent in these duties.

The General Court of the Massachusetts Bay Colony in 1642 required parents and masters to ensure “their children and apprentices [acquire] so much learning as may enable them to read perfectly the English tongue and to get knowledge of the capital laws” (Provasnik, 2006, p. 315). New Haven, Connecticut and Plymouth, Massachusetts enacted similar laws between 1650-1671 (Provasnik, 2006). Parental negligence, however, prompted additional laws. The Old Deluder Satan Law of 1647 was born out of parental negligence to educate their children. It was believed that Satan was keeping individuals from the Scripture, so learning to read the Bible would keep Satan away. The Old Deluder Satan Law was the first attempt to organize a formal school. The law required a townsperson to be appointed as the teacher and a grammar school would be established to prepare men for the university, which at the time, was for training young

men for ministry (Matzat, 2004). The Old Deluder Satan Law, however, did not require student attendance.

Illiteracy Abounds: New Leaders, New Educational Focus

As persons were granted 100-150 acres of land for taking in indentured servants in an attempt to help settle the outlying lands, colonial America expanded to more rural areas and it became more and more difficult for people to attend church or school. Children who received a more consistent education were often from the cities. The lack of schooling intensified over the next two generations, which in turn led to increased illiteracy and in the eye of the church, a loss of morals. Church leaders talked of reviving the colonists.

The Great Awakening movement, 1679-mid 1700s, not only brought many individuals to Christ, but also brought the first thread of equity in education as preachers proclaimed, “if the ground is level at the foot of the cross, education should be available to all as well” (Matthews, 1995, para.26). The First Great Awakening movement in America faded into the Age of Reason, or Enlightenment, when intellectualism, the knowledge of science and math, not religion, was of importance. Leaders turned from church heads to those in society who were of higher intellect. Intellectuals were now considered the leaders of the time.

Eighteenth Century: The Intellectualism Influence

By the 18th century, scientists, mathematicians, and European pedagogists and philosophers influenced the instruction given to children (Carpenter, 2004; James, 1962; Jefferson & Peterson, 1984; Rayner, 2001). It was commonplace in the 18th century to

separate individuals of higher intellect and those of lower intellect, distinctly creating *educable* and *non-educable* groups of children (Kliwer & Fitzgerald, 2001). Society wanted the most learned students to advance: Intellectuals would be the future leaders.

By 1779, Thomas Jefferson proposed a *Bill for the Diffusion of Knowledge* for educating the *common people* (middle-lower class) in which those whom nature endowed with greater *genius* (intelligence), would receive higher education. Although proposing three years of basic education for all children, tuition gratis, only select primary (public) school boys of *genius* could advance to higher levels of education and thereby, securing the future leaders to be of utmost intelligence (Jefferson & Peterson, 1984). Children of wealthy parents, however, could advance in education so long as parents could financially support them.

Children with lesser cognitive abilities often went unnoticed, especially in rural areas due to the slower paced life style and apprenticeship or agrarian education. Individuals with disabilities who predominantly had vision, hearing, physical, or severe emotional disabilities were usually institutionalized or placed in *Imbecile Schools* (schools for educating individuals with cognitive disabilities) or *Hospitals for Lunatics* (institutions for individuals with emotional or behavioral disabilities) if the families could not care for them.

Education in the Nineteenth Century

America was engulfed in the California Gold Rush of 1849, expanding the westward movement and rural living. Many more settlers moved west with the distribution of land with the Homestead Act of 1862. The frontier that settlers had come

to know had disappeared by 1890. The great movement Westward was soon replaced by the drive to industrialize America. The introduction of steam power, the mechanization of textiles, and electricity changed society drastically. The Industrial Revolution and its need for workers drew children as young as six years old to work in factories rather than attend school. Not only did America experience its first recognized drop-outs, but the need for skilled workers rose dramatically.

In response to the increased demand for skilled labor, The Morrill Act of 1862 provided for land and federal aid for vocational education, whereby land was given to states to build colleges that would include education for agriculture, mechanical, and practical education for industrial classes (Preer, 1990). Vocational training was now being supported by the government, but low attendance at school was still commonplace. Construction of new schools did not warrant attendance. Schools for delinquent boys were constructed by the second half of the 19th century (Franklin, 1994). Compulsory attendance laws which began in 1840 in Rhode Island did not become law in all states until 1918. Due to the inconsistencies of enforcing the compulsory attendance law, many children still did not attend school even into the 1920s.

Economic Depression Leads to Literacy Ultimatum

America experienced an economic depression in the last quarter of the 19th century (Heffner, 1991). Members of households who were able to work did so, even at the expense of their education. Lack of enforcing school attendance and a family's need for basic food and shelter, resulted in many children remaining uneducated. The 1870 census of nine states revealed that over 51% of the population could not read or write

(Editor, 1876). Americans were given an ultimatum: Learn to read or you will not be allowed to vote (Editor, 1876).

Monies to Educate Individuals with Disabilities

Educational decisions for individuals with disabilities were influenced by societal expectations and values (Barnard & Best, 1961; Bascom, 1891; Carleton, 1972). By the late 1800s and continuing into the first three decades of the twentieth century, benevolent groups, such as women's organizations, held special tutoring and programs for children who had difficulties with their studies. Most children with more severe disabilities were placed in institutions, private facilities, and state schools.

New state schools and private institutions for individuals with disabilities sprang up throughout America. In 1827, Public Law 19-8 designated land in Florida and Kentucky for building *Asylums for the Deaf and Dumb* (individuals who were deaf or hearing impaired and non-verbal). In 1857, Public Law 34-36 established *Columbia Institution for the Deaf and Dumb*, which later was renamed Gallaudet University (Mast, 1984). A number of state institutions, private and residential facilities, were built in Connecticut, Massachusetts, New York, Ohio, Rhode Island, Illinois, and California (Hopkins, 1982). Many children considered *mad, crippled or feeble-minded* (children with emotional, physical or cognitive disabilities) were educated in special state or private schools, asylums, *Hospitals for Lunatics*, for individuals with emotional disabilities, or *Institutions for Imbeciles*, for individuals who have cognitive disabilities (Monroe, 1894).

Society saw individuals with disabilities as defective and often categorized them into classes for *improvables* or *unimprovables* based upon the ability to educate, or improve them enough so as to meet the standard that society expected of learned individuals and their ability to contribute to their community (Trent, 1998). Trent describes how societal views of *defectives* (individuals considered abnormal and who could not contribute to society) changed through the exhibition displays and commentaries at the 1904 World's Fair. The Fair contributed to the delineation of *educable* versus *non-educable* individuals with disabilities. The Living Exhibits displayed individuals with disabilities performing jobs and tasks that, up until that time, had been deemed by society to be unobtainable by individuals with disabilities.

Parents hoped to 'cure' children of their disability (educated enough to contribute to the community) and as such, admitted many children into residential care or private schools with the hopes of one day, transitioning into the public school system where children could be "passed over to the intellectual land of promise" (Kliewer & Fitzgerald, 2001; Monroe, 1894, p. 7). Institutions grew crowded as parents advocated for their children to be placed into the educational institutions and private facilities. Increased enrollment meant the need for increased state support monies, but communities objected to the amount of resources that were used for the state schools for *feeble-minded* and *idiot* children (children with cognitive disabilities).

Communities felt that the state schools had become "ever larger locations of physical and moral confinement" (Kliewer & Fitzgerald, 2001, p. 463). Over time, institutions and residential facilities were not experiencing the success rate anticipated,

communities cried out over the expenditures, and subsequently placed the *incurables* (children whose disability could not be ‘cured’) into the public schools (Kliewer & Fitzgerald, 2001).

Societal views of educating children with disabilities shifted from an institutional setting to the public school setting. The mindset of society regarding the education of children with disabilities changed with advent of the Compulsory Attendance Act and public exposure to the evidence that individuals with disabilities could be taught specific skills (Trent, 1998). Rhode Island and Illinois established special classes in the public school system for the *mentally retarded* (children with cognitive disabilities) and for children who were blind. Monroe (1894) wrote of success stories of the education or training of children in California who were *feeble-minded* (cognitive disability) and that the institution was “a link in the chain of public schools” (p. 8). Society had an image of those who fit into the social norm and separate public education for children with disabilities was expected.

Twentieth Century: Public Education for Children with Disabilities

Public school education for *children with handicaps* (children with disabilities) became more widespread as America entered the 20th century (Mast, 1984). As the compulsory attendance laws gained momentum at the turn of the century and classes became more crowded, educators felt that the specialized attention and curriculum needed to educate *children with defects* (children with disabilities) and *backwards children* (children who appeared normal but tested below average on intelligence tests) in the public school hindered the education of the majority (Hendrick & MacMillan, 1988;

Kliewer & Fitzgerald, 2001). Educators felt it best to segregate the *children with handicaps* and give them a more specialized education within the public school setting. Educators believed that with segregation, children with disabilities would receive a more reasonable education, one that was more specialized to meet their abilities; not an equal education, but an equitable one. Not the same curriculum as the majority, but one that was fair and would accommodate their abilities.

Government Defines Remedial Programs

Twentieth century governmental legislature continued to influence instructional philosophies for children with disabilities (Baker, 2004; Barnard & Best, 1961). The White House Conference of 1909 “define[d] and establish[ed] remedial programs for children with disabilities” (Yell, Rogers, & Rogers, 1998, p. 221). Overcrowding of public school classes, the high cost of managing residential institutions, and community objections, combined with the opinions of educators and other professionals, prompted a new look at how to educate *defectives, backwardness, and morons* (children with physical, learning, and cognitive disabilities).

The Smith-Hughes Act also known as the Vocational Act of 1917 approved federal funds for educating children in the vocational trades in the public schools. The White House Conference of 1930 reported that for children with *mental retardation* (cognitive disabilities), there needed to be a heavy emphasis on practical applications such as vocational and shop skills, homemaking, and direct instruction in the application of skills in order to foster more independence in the children. Unfortunately, vocational education classes often required separate facilities due to the larger rooms required for

the extensive array of equipment needed, and thus separated students with disabilities from their peers in general education (Hendrick & MacMillan, 1988).

Great Depression: Placement in Special Classes Increases

As American families experienced the financial pains of the Great Depression, so did the educational systems. Budget cuts affected all areas of education. It became more cost effective to place any child who did not meet the typical mainstream requirements into the special classrooms (Franklin, 1994). Children who had difficulty learning or did not conform to the majority were placed in special classrooms. Up until this time, only the children with more severe disabilities were placed in special classrooms. The number of children in special classes increased, but with limited funds the classrooms for children with disabilities became more custodial than instructional (Dorn, Fuchs, & Fuchs, 1996; Yell et al., 1998). This pattern of separate educational facilities or classes for children with disabilities remained constant until the establishment of legislation supporting the educational rights of individuals with disabilities.

Reforming Education

New legislation not only supported equal education for individuals with disabilities, but also highlighted the inequalities in the educational system as a whole (Gallegos, 1989; Yell et al., 1998; Zirkel, 1994). Until the mid-20th century, education for children was based upon intelligence and familial economic status and most importantly, future contribution to the community. The mid-20th century saw education as a more democratic process, that all children should be educated on equal terms. By mid-20th century, the United States Supreme Court decisions, the Civil Rights Act, and pivotal

civil cases paved the way for educational laws for elementary and secondary school children, the Education for All Handicapped Children Act of 1975 (Public Law 94-142), and the Americans with Disabilities Act of 1990.

Civil Rights Cases: Sweeping Changes

In the 1954, *Brown v. Board of Education of Topeka, Kansas*, Chief Justice Earl Warren repudiated the 1896 *Plessy v. Ferguson* decision of ‘separate but equal’ facilities in that separate educational facilities are inherently unequal and the “opportunity for an education...must be made available to all on equal terms” (Yell et al., 1998, p. 219). Prior to the *Brown* decision, educational opportunities were deemed equal but separate, in that every child was provided with equal education, but in separate schools based upon race. The plaintiff in the *Brown* case argued that the separation alone connotes an inferiority stigma and the stigma would be carried over into adult society. Upheld in the Supreme Court ruling, *Brown v. Board of Education* required schools to be held accountable for allowing equal educational opportunities to children regardless of race (Nieto, 2005; Wong & Nicotera, 2004; Yell et al., 1998). “*Brown* resulted in sweeping changes in the schools’ policies and approaches to students with disabilities” (Yell et al., 1998, p. 220).

The *Brown* decision was the first brick on the road of the Civil Rights movement. Ten years later, the Civil Rights Act of 1964 and radical changes in governmental policy paved the way for equal education rights and privileges for all children (Baker, 2004; Hamilton & Yohalem, 1982; Mast, 1984). The Civil Rights Act of 1964 protected the rights of individuals in public places and in education by proclaiming segregation unlawful. Equality rights in education soon followed.

Legislation to Equalize Educational Opportunity for All

The Elementary and Secondary Education Act of 1965 (ESEA) sought to equalize educational opportunities. Although ESEA primarily addressed educational opportunities for the disadvantaged, it did not overlook the needs for educating children with disabilities. The ESEA of 1965, together with the appropriation of funds for training teachers of children with *mental retardation* (cognitive deficits) and programs for students who were disadvantaged, disabled, or gifted became the catalysts for future legislation that supported the rights of individuals with disabilities (Hamilton & Yohalem, 1982; Yell et al., 1998).

In 1966, the *Equality of Educational Opportunity*, known as the Coleman report, revealed that neither educational facilities nor their resources affected educational outcomes for students; instead, attitudes and aspirations of peers. The student body educational background and their aspirations had more affect on student achievement than curriculum, teacher quality, resources, or facilities (Wong & Nicotera, 2004). The Coleman report verified that the inequalities in education had a foundation: Inequality results more from societal expectations and attitudes than from socio-economic status.

Sparked by the Civil Rights movement, parents and advocacy groups turned to legal action to force education agencies to allow children with disabilities the same liberties as other children, the right to an equal education. By 1970, American schools educated only one in five children with disabilities, and many states had laws excluding certain students from public school systems, including children who were deaf, blind, diagnosed with emotional disorders or mental retardation (Bushweller, 2005). Of the 2

million children out of school in the 1970s, the majority were diagnosed with a disability, poor, non-white, or English Language Learners. Forty-eight states had exemptions in the compulsory attendance law for children who were categorized with physical, mental, or emotional disabilities, while those who did attend school were either institutionalized far from home, mislabeled or placed in classes for the *educable mentally retarded* with minimal regard for individual needs (Hamilton & Yohalem, 1982).

Legal Decisions to Support Individuals with Disabilities

Parents and advocacy groups challenged the system. Two most notable cases are *Pennsylvania Association for Retarded Citizens (PARC) v. Commonwealth of Pennsylvania* (1971) and the 1972 *Mills v. Board of Education D.C.* The main argument presented in *Pennsylvania Association for Retarded Citizens (PARC) v. Commonwealth of Pennsylvania* was that students with mental retardation did not receive publicly supported education: The children were not allowed the right to a free public education. The 1971 *PARC v. Pennsylvania* resolution is viewed as a landmark case and one that “set the stage for continued developments regarding the educational rights of students with disabilities” (Yell et al., 1998, p. 223). As a result, “all children with mental retardation between the ages of 6 and 21 years must be provided a free public education” (Yell et al., 1998, p. 223).

In the 1972 *Mills v. Board of Education D.C.* case, the charge claimed that the District of Columbia failed to provide publicly supported education and training to children with disabilities and further excluded, suspended, expelled, reassigned, and transferred these children without proper due process of the law (Yell et al., 1998). The

court decision included that districts outline a plan to label, place, or exclude students with disabilities and to include procedures to protect parental rights. The *Mills* decree set the framework for the Education for All Handicapped Children Act of 1975.

By 1975, Congress passed Public Law 94-142, the Education of All Handicapped Children Act (EAHCA) which required public schools to provide a free appropriate public education (FAPE) to all eligible children with disabilities, in the least restrictive environment appropriate to their individual needs (Yell et al., 1998). EAHCA was renamed in 1990 to the Individuals with Disabilities Act (IDEA) when a primary amendment change in the language of the law emphasized person first language (i.e., changing handicapped child to child/individual with a disability). Public school access for students with disabilities increased.

To improve access to copyrighted materials, including textbooks, the Chafee Amendment to the copyright law was enacted in 1996. The Chafee Amendment allowed individuals who have a reading disability significant enough to prevent them from reading print-based materials, the access to alternatively formatted materials and assessments.

Congress then looked to improve performance and achievement for students with disabilities in both the special education curriculum and the general education curriculum with the reauthorization of IDEA in 1997 (Yell et al., 1998). IDEA '97 mandated that educators first consider providing services to students with disabilities in the general education environment and that those programs should align with the state and local

standards. Legislative mandates for student achievement changed not only education for children with disabilities, but also education for the mainstream.

Legal Changes in General Education

In 1988, the Hawkins-Stafford School Improvement Amendment, a re-authorization of Elementary and Secondary Education Act (ESEA), focused on state standards and assessments, holding local districts accountable for demonstrating improvement in test scores. In 1994, President Clinton approved *Improving America's Schools Act* (IASA), adding the notion of adequate yearly progress (AYP) on standardized achievement tests for all students. AYP is the amount gained on standardized test scores from one year to the next, with each state specifying the expected amount of progress. Despite the mandate to include all students, many children with disabilities were exempt from taking these achievement tests.

The ESEA was reauthorized in 2001. Renamed the No Child Left Behind Act, NCLB, focused primarily on accountability for achievement test results. NCLB also addressed education of the disadvantaged, as well as equality issues in education (Fusarelli, 2004). Not discounting the other areas NCLB addresses, the discussion here remains upon educational opportunities for children with disabilities.

NCLB required not only that all students be tested through state standardized test measures, but all achievement scores made available to the public. NCLB highlighted the academic proficiency of all students, including students with disabilities, based upon state standardized tests at their grade level. NCLB also required that states disaggregate achievement data of “the lowest performing subgroups defined by race, ethnicity,

poverty, English-language learner (ELL), or disability” to show how subgroups performed compared to same grade peers (Fritzberg, 2004, p. 12). Prior to NCLB the subgroup information was minimized and not typically disclosed to the public.

NCLB argued that all children could attain the same level of achievement by standardizing the outcomes for all students and testing all students using standardized tests. As NCLB proclaimed that no child should be left behind, there were states and local school districts objecting to NCLB, stating direct conflict of mandates of IDEA’97 for many students with disabilities and Individual Educational Plans (IEP), (Dolan, Hall, Banerjee, Chun, & Strangman, 2005; Samuels, 2005).

Two Streams, Same Goal: Student Achievement

Legislation for students with disabilities remained focused on teaching and learning of the general education curriculum, accessible through the IEP process. Federal legislation, though, mandated a standardized curriculum, maintaining that all learners achieve mastery of a set of goals or standards (NCLB, 2001). The NCLB concept of group standardization of educational goals conflicted with the individualization concept set forth by IDEA ‘97. Both IDEA and NCLB argued valid points. NCLB mandated that all children can achieve a standard level of educational mastery while IDEA supported the notion that there are differing levels of achievement, based upon each individual learner. NCLB and IDEA stood juxtaposed. Though the paths divergent, the foundations were the same; education for all children.

As NCLB trickled down to the schools, educators focused on what to do with the children identified as low achieving. In accordance with NCLB, all children were to be

tested on grade level state achievement tests. School districts, advocates and parents of children with disabilities thought differently. Outraged by the NCLB testing requirement, school districts, parents and advocates of children with disabilities sought legal counsel (Samuels, 2005). IDEA ensured the right to an individualized education through the IEP process. NCLB was denying that right.

The reauthorization of IDEA was inevitable. In 2004, IDEA was reauthorized and the Individuals with Disabilities Education Improvement Act (IDEIA 2004) added the use of universal design principles, to the extent feasible, in developing and administering state, district, or local assessments (Wright, 2004). The notion of universal design for learning was introduced in IDEIA 2004 to bridge the gap between political views and requirements of NCLB and IDEIA 2004. Universal design in teaching and learning promotes that curriculum be created following a recommended set of principles, so that the information can be accessed by the greatest number of students possible (Acrey, Johnstone, & Milligan, 2005; Coyne et al., 2006; Dolan et al., 2005; Edyburn, 2005; Hitchcock & Stahl, 2003; Pisha & Coyne, 2001; Rose & Meyer, 2002). Universal design for learning principles are based upon scientific research related to the learning areas of the brain.

Brain Research and Theory Related to Learning

Recent research on the brain provided evidence that the brain of non-impaired individuals and the brain of individuals with dyslexia function differently while reading and decoding words (B. A. Shaywitz, Lyon, & Shaywitz, 2006; S. E. Shaywitz & Shaywitz, 2004). Functional magnetic resonance imaging (fMRI) revealed that

individuals with no reading impairments were more inclined to use areas in the left hemisphere of the brain for decoding and comprehension while individuals with dyslexia, particularly older teens and adults, used less of the left and more of the right hemisphere of the brain, leading researchers to conclude that older individuals with dyslexia have acquired compensatory strategies for reading (B. A. Shaywitz et al., 2006).

Lev Vygotsky (1978) proposed that in order for students to learn optimally, they should neither be bored with problems they already know how to solve, nor be struggling with problems that are too difficult to solve independently. Vygotsky describes the period of development that lies between these two learning situations as the zone of proximal development (ZPD). The ZPD is “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (p. 86).

Brain Networks Related to Vygotsky's Theory

The cortex area of the brain is responsible for processing and managing information and learning. The cortex is made up of cortical tissue which houses a vast network of neurons, each connected and interconnected. Within this vast arrangement of neurons lie three interrelated networks of neurons that function together to process information. These three networks are the recognition network, the strategic network, and the affective network (Rose & Meyer, 2002).

Current computer imagery and technology allows for the viewing of neural-transmissions as the brain processes information. Dynamic brain imaging has given

scientific evidence that individuals do not all process information in the same manner, even though the physical makeup of brain tissue is essentially the same for everyone (Rose & Meyer, 2002). Positron Emission Topography (PET) scan images of the brain during the learning process viewed in real time has unveiled a plethora of information about learner differences.

The recognition network “enables us to recognize voices, faces, letters and words, as well as more complex patterns, such as an author’s style and nuance, and abstract concepts like justice” (Rose & Meyer, 2002, p. 13). The recognition network receives and analyzes information and is located near the back of the brain. Positron Emission Topography (PET) scan images of the brain reveal that each learner does not receive and analyze information in exactly the same way. Through PET scans, a set of words presented orally shows that the brain recognizes the words in one area, while the same set of words presented visually is recognized in another area of the brain. While the PET scan images may show a certain cortical-neuron-area hot-spot for one learner, it may be slightly different for another learner (Rose & Dalton, 2006). For example, the PET scan images of a learner with dyslexia are different than those of a fluent reader. Knowing these differences in recognition networks supports the need for teachers to individualize the presentation of information in the learning process.

The strategic network “plans, executes, and monitors our internally generated mental and motor patterns” (Rose & Meyer, 2002, p. 21) and is located in the frontal lobes of the brain. The PET scan images and brain activity of the frontal lobes show how the brain plans and executes actions while processing information. Note taking requires a

student to listen, extract important information, and then, write it down. Some students may be quite adept at planning but not at organizing or keeping track of the information (Rose & Meyer, 2002).

The third network, the affective network, is located at the core of the brain. The affective network evaluates and sets priorities, guides those priorities, and then, chooses the action to complete the process. This network also assists in keeping the student focused and is responsible for processing emotional information like facial expressions, tone of voice, or body language. The affective network likewise processes the inner (self) emotions, not just emotions of others. Teachers often find that students who have experienced emotional trauma have difficulty with their assignments or with paying attention in class. In such cases, the emotional affective network strongly influences the student, making the recognition and strategic networks process ineffectively. Without effective interconnectedness of the three learning networks, processing information is difficult. The affective network is the most essential piece of the triad. A student who has little to no emotional connection or interaction with the learning process subsequently inhibits both the recognition and strategic networks from accurately processing information, and prevents learning to progress (Rose & Meyer, 2002).

Supporting the Network Triad

The triad of learning networks; recognition, strategic, and affective are all interconnected during the learning process. Support of each network during the learning process is imperative (Rose & Dalton, 2006). Knowing the variances in the brain network processes helps teachers to “analyze student strengths and weaknesses and to understand

the individual differences” (Rose & Meyer, 2002, p. 37). Understanding individual differences is the first step to creating a learning environment that supports diverse learner needs.

Universal Design for Learning

The functions and communication between the three brain networks are the backbone of universal design for learning principles. “The universal design for learning framework consists of three overarching operative principles...each advocates a particular teaching approach for supporting learner differences in recognition, strategy, or affect” (Rose & Meyer, 2002, p. 74). The first universal design for learning (UDL) principle supports recognition learning and places emphasis on providing multiple, flexible ways of presenting information to the learner. As one can imagine, each learner does not receive and analyze information in exactly the same way. This principle allows variety in the way the learner acquires the information being presented (Rose & Meyer, 2002).

The second UDL principle supports strategic learning and provides multiple, flexible methods of expression, allowing students alternative ways to demonstrate what they know (Rose & Meyer, 2002). Allowing multiple ways for a student to demonstrate outcome mastery or acquisition of knowledge is an example of this UDL principle.

The third principle of UDL supports the affective network of the brain and states that there should be provisions for multiple, flexible ways to engage, challenge and motivate students (Rose & Meyer, 2002). For example, the emotional attachment each student has for a task or assessment varies from student to student. Test anxiety can be

extremely high for some while for others, tests cause minimal anxiety (Rose & Dolan, 2006). Having tasks and assessments available in a variety of formats aids in lessening anxiety, increasing motivation and engagement with the task or assessment.

Basis of Universal Design for Learning

Universal design for learning is based upon the idea of universal design in architecture. As engineers and architects design buildings, the idea of accessibility is prominent throughout the design, making sure the design of the building is accessible to as many people as possible. It is more efficient and cost-effective to create the building with accessibility features built-in rather than trying to retrofit the building with accessibility features after the building is completed (Meo, 2008; Rose & Meyer, 2002). UDL strives for this built-in-accessibility-features idea as well. Creating a curriculum with UDL principles accommodates more diverse learner needs upfront and consequently requires fewer accommodations for individual learning styles after the lesson is presented (Coyne et al., 2006).

Implications for the Teaching and Learning Process

Traditional teaching practices are challenged by recent brain research and federal mandates that dictate the use of universal design for learning for all state and local assessments, as well as the addition of UDL to the Higher Education Opportunity Act 2008 ("HEOA", 2008). Universal design for learning, by its very design, challenges traditional teaching methods by incorporating flexible curriculum design. Teachers using UDL move from traditional lecture-based teaching to a more engaged student-centered approach. Brain research verifies that not all children learn the same way (Rose & Meyer,

2002). Teachers then need to plan for a richer, more multi-modal approach to teaching and learning.

UDL assists educators in developing lessons that incorporate the flexibility needed to accommodate the needs of diverse learners by creating a more differentiated learning environment (Coyne et al., 2006; Pisha & Coyne, 2001; Proctor, Dalton, & Grisham, 2007; Rose & Meyer, 2002, 2006). With UDL, educators not only keep the instructional goal in mind, but also consider alternate ways to present the information needed to attain that goal and various ways students can represent their acquisition and synthesis of the information. Curriculum and lessons designed with UDL principles showcase educators in a more facilitative role, guiding students through the learning process (Mason & Orkwis, 2005; Rose & Meyer, 2006).

Tools to Examine Change

Concerns-Based Adoption Model

The dimensions of the Concerns-Based Adoption Model (CBAM) address the feelings teachers have during the implementation of an innovation (Ellsworth, 2000). The stages of concern were built upon the concerns Frances Fuller identified in 1969 of pre-service teachers as they progressed through the teacher education program (Hall, 1978). As described by Hall, Fuller noticed that new pre-service teachers began unconcerned with the idea of teaching, completely maintaining an *unrelated* position of concern. As the program continued, the pre-service teachers began to relate the *self* with teaching by questioning their own ability to teach. From this wonderment, came the concerns of spending too much time on *tasks* like planning lessons and eventually came to ask

themselves, “Is what I am doing *impacting* the students?” Hall illustrated the 1973 development of CBAM from Fuller’s description of concerns, verifying that after “conducting a series of cross-sectional and longitudinal studies” the stages of concern *do* exist (p. 6).

CBAM Stages of Concern

The first of the CBAM dimensions is Stages of Concern (Ellsworth, 2000; Hall, 1974, 1978, 1979). In 1973, Hall, Wallace, and Dossett developed a conceptualization of the stages of concern within education (Ellsworth, 2000). Hall (1978) recognized that “change is a personal experience” and that the concept of *concerns* described an individual’s perceptions, feelings, and motivations about an innovation (p. 7). As teachers progressed through the educational change process, they experienced various stages of concern and levels of use of the innovation (Ellsworth, 2000; Hall, 1974, 1978, 1979). The CBAM model evaluates the teacher feelings during the change process and can measure areas of concern of the implementation of UDL, thereby allowing for additional professional development or intervention for improvement toward the innovation model, in this case, universal design for learning.

Teachers move through the CBAM dimension stages of concern (SoC) during implementation of an innovation. Each stage reflects Fuller’s identification of pre-service teacher behaviors and feelings of concern, from “early self-oriented concerns, to task-oriented concerns, to ultimately impact-oriented concerns” (Hall, 1979, p. 204). Teachers typically move from stage to stage, but this is not necessarily true of all teachers. Some may begin in higher stages and others may stagnate at various stages. However, for

purposes of this writing, the SoC are presented linearly, starting with the lowest stage. Since the title of this paper reflects the focus of this study: teacher perceptions of UDL, the reader should know that the terms ‘innovation’ and ‘UDL’ should be viewed synonymously while discussing the CBAM Stages of Concern throughout this document. The reliability and validity of the SoCQ will be discussed in Chapter III.

In the CBAM stage 0, Awareness, teachers are not concerned at all with the innovation. It is not necessarily true that an individual does not want to learn about the innovation, but that there are other concerns that are taking priority at that time. This stage indicates the degree to which the innovation, and in this case, UDL, is central to the individual’s thinking. It does not indicate whether or not the individual is implementing UDL, only how high of a priority UDL is for that person (George, Hall, & Stiegelbauer, 2006).

In stage 1, Informational, teachers want information about the innovation and at this stage are not worried about their personal relationship with the innovation. Individuals in this stage want the basics, not the details. Individuals with high stage 1 scores do not necessarily have a lack of knowledge of UDL, but that they want to know more (George et al., 2006). They want to know what UDL will do and what it will take to implement UDL.

In stage 2, Personal, teachers begin to worry or wonder how UDL will affect self and begin to analyze their role, make decisions and establish commitment. Individuals in this stage are so concerned about what effect UDL will have on them, that other concerns might not be revealed (George et al., 2006). These individuals want to know what good

things they will get for implementing UDL, the recognition, the praise, the rewards. The focus on ‘self’ consumes the thought processes in this stage.

In stage 3, Management, the individual attends to organization of tasks involved and management of time in order to implement the innovation. Individuals in stage 3 are concerned with scheduling, resources, and overall management of the innovation. These individuals are concerned with being efficient and doing the best they can with innovations (George et al., 2006). They spend a lot of time getting the right resources, planning and making sure everything for the innovation is in place.

In stage 4, Consequence, individuals question how the innovation is benefiting the students, examine outcomes, and make changes to the innovation to increase outcomes. The concerns move away from themselves and begin to focus on students, how UDL might influence student learning, and how can they make UDL better (Hall, 1979).

In stage 5, Collaboration, individuals feel comfortable enough to discuss the use of the innovation with others, coordinating their efforts of implementation. Individuals in this stage are typically administrators, department heads, or other educational leaders (Hall, 1979).

In stage 6, Refocusing, individuals are confident and knowledgeable enough to make major changes to the innovation that they view as improvements. These individuals sometimes feel something might be wrong with the innovation and want to change it or they may view something else as better (George et al., 2006; Hall, 1979).

A validated Stages of Concern Questionnaire (SoCQ) is used to determine an individual’s stage of concern. The questionnaire and resultant data provide districts with

information regarding the feelings of teachers or other individuals who are affected by an innovation or change in their program (George et al., 2006; Hall, 1979). The data from SoCQ can be used to support the need for additional trainings, in-service, or face-to-face contact to help resolve teacher concerns during implementation of an innovation.

CBAM Innovation Component Checklist

While the SoC explains the affect of individuals who are involved in the change process, another CBAM dimension examines the innovation itself and how differently it can be interpreted and implemented from one individual to the next (Hall, 1978). The innovation configuration component checklist depicts “what effective innovation use actually looks like in its intended setting” (Ellsworth, 2000, p. 43) and examines the components of the innovation and how teachers, the change adopters, use the innovation differently. The checklist or map is comprised of critical components of the innovation that must be in place in order for successful change to occur. By establishing a checklist or rubric of the key components and implementation adaptations of an innovation, change adopters (teachers) and change agents (typically the educational administration) examine what the “use” of the innovation looks like and are able to implement any needed interventions (Ellsworth, 2000; Hall, 1978). A CBAM innovation component checklist or map would indicate how much UDL is integrated into the teaching and learning process. The process of developing a CBAM innovation configuration (IC) map requires interviewing the innovation developers, identifying the components, refining the map, and testing the IC map (Hord, Stiegelbauer, Hall, & George, 2006).

CBAM Level of Use

Another dimension to CBAM is ‘level of use’ (Hall, Dirksen, & George, 2006). The level of use is what the teacher is actually doing with the innovation; the behavior and performance with the innovation. During the implementation process of an innovation, a specific interview protocol provides insight/information as to the level of use (LoU). A focused interview protocol is used to determine the level of use (Ellsworth, 2000; Hall et al., 2006). The LoU interview process requires specific training to administer properly.

Systemic Change

Systemic change models that utilize both top-down and bottom-up implementation strategies, in which teachers undertake the initiative alongside administrators, create a more positive, lasting change in teaching and learning (McGuire, Scott, & Shaw, 2006). In Fullan and Stiegelbauer’s 1991 edition of *The New Meaning of Educational Change*, as cited by Ellsworth (2000), students are also viewed as stakeholders in educational change. “Students should be encouraged and empowered to participate as active partners in shaping their learning experience and the school that supports it” (p. 90). Learning communities that experience systemic change require a shared vision and a shift of mind among its members (Ellsworth, 2000; Senge, 1990). One example of systemic change and UDL implementation is the Concord Model that follows.

Concord's Seven Steps to Systemic Change to UDL

Incorporating the three principles of UDL into curriculum and lesson planning encourages a paradigm shift in how educators look at learner differences. With this paradigm shift in teaching practices comes major systemic changes. A model for systemic change toward UDL would encourage a shift away from curriculum that relies on traditional print-based textbook learning to a more flexibly designed curriculum. A more flexible curriculum would provide alternate ways of presenting the textbook information to meet the diverse needs of the learners. One school district in Concord, New Hampshire identified the components to systemic change relevant to implementing a more flexible curriculum.

Concord school district began in the 1990s with both a bottom-up (one teacher, one student) initiative and a top-down (administrative) approach to implementing UDL into the district. What began as an initiative to embed more technology into the curriculum ended in a grand systemic change throughout the district. Being dissatisfied with the status quo is a major condition to encourage change (Ely, 1990). In this case, the drive for embedding more technology encouraged the systemic change. Technology made UDL happen by challenging the UDL implementers to move forward. During this process, seven key components emerged that helped Concord to implement UDL in to their school district (Rose & Meyer, 2002).

Building and supporting a technology infrastructure “is [was] a valuable first step toward UDL” (Rose & Meyer, 2002, p. 162). Concord’s model stressed the importance of access to digital text in order to lessen the barrier that printed text imposes upon many

students with disabilities. Integration of technology was the key to overcoming barriers imposed by the print-based textbooks. Specific assistive software, like a text-to-speech application enabled the computer to read the digital text to a student with reading disabilities. Having resources readily available for both teachers and students remains the most obvious condition for successful systemic change (Ely, 1990).

Gaining administrative support was also a key component to successfully implementing UDL in Concord Schools. Once the administration (principals, other administrators, and school board members), agreed with the implementation of UDL, teachers felt that the change to UDL was worthwhile. Evidence that there is ongoing support for the innovation helps create lasting change (Ely, 1990). Teachers were also given release time to increase their knowledge of UDL (Rose & Meyer, 2002). Ely's fourth condition of his Conditions of Change model "requires that time is available" (Ellsworth, 2000, p. 69).

Teacher release time was spent on UDL training and support. Teachers in Concord chose to attend any of the workshops offered, work on curriculum development, collaborating, or planning UDL lessons. One model Concord found to be successful was the mentoring model. One teacher was trained thoroughly in all aspects of UDL and necessary software applications. The teacher then mentored two other teachers per year in the UDL implementation process (Rose & Meyer, 2002). The mentoring process continued each year.

Teacher roles became redefined through the Concord model. Special education teachers, general education teachers, and technology specialists collaborated during

curriculum planning. Teachers worked together to create lesson plans and both general and special education teachers were involved in the UDL lesson implementation (Rose & Meyer, 2002).

Collaborative curriculum planning took the expertise of general education teachers, special education teachers, and technology specialists. The focus shifted from looking at one student and the adaptations required for that individual, to looking at the curriculum itself to find potential barriers that might impede the teaching and learning process for any student (Rose & Meyer, 2002).

Parents and community members served as agents of change in the Concord model (Rose & Meyer, 2002). Parents of students with disabilities were very informed and raised issues that promoted district action. Often times the issue was for one particular student, but applicable to many others and with the potential to promote change throughout the district.

With the implementation of UDL into curriculum and the increased use of technology, funding resources became an issue. In response, Concord developed creative funding practices. For example, teachers, departments and district level grants were all encouraged to support the technology needed for implementing UDL (Rose & Meyer, 2002).

The Concord model was developed in the 1990s, and some of the components may not be relevant to current district situations. The model was, however, a starting point for districts considering UDL implementation and in need of guidance during the systemic change process.

Response to Intervention, Positive Behavioral Support, and Systemic Change

Response to Intervention (RtI) is an example of recent systemic change that stems from top-down decision-making. A succinct description of RtI is necessary only to introduce its implementation strategies for systemic change:

The No Child Left Behind Act of 2001 in conjunction with the Individuals With Disabilities Education Act amendments of 2004 (IDEA) have created incentives to improve how K-12 instruction is provided and to improve the achievement of all students, including those with disabilities...An emerging framework that provides an infrastructure to support the use of evidence-based practices and provides a model for instructing and intervening on behalf of all students to help improve their achievement is response to intervention (Danielson, Doolittle, & Bradley, 2007, p. 632).

Most states have chosen to implement the RtI framework and as a result, states and districts must implement a plan of action that supports RtI with research-based methods. Danielson et al. (2007) identified the necessary implementation components for lasting systemic change through the framework of RtI. To start, all stakeholders must understand RtI in order for the paradigm shift to occur. Additionally, professional development must occur across all levels and for all stakeholders in order to build capacity, a major component in creating systemic change (Danielson et al., 2007). High quality support for teachers and implementation strategies that focus on the issues of RtI adoption must be in place to promote effective systemic change.

Response to intervention is not limited to special education and can be implemented as a universal process to serve all students, monitoring the progress of all students and making sure each student is benefiting from the intervention or instruction. Likewise, the School-wide Positive Behavior Support (PBS) model supports all students with research-based preventative and proactive behavioral management (Sugai & Horner, 2002). PBS promotes systemic change to support academic success and positive school climate through research-based strategies. Like RtI, the success of PBS is limited by the implementation process, professional development, administrative buy-in, and the resources to support it.

The point here is to stress the importance of the components needed to implement systemic change. Both RtI and PBS began as top-down initiatives through federal mandates. Likewise, the Individuals with Disabilities Education Improvement Act 2004, Part B states that “The State educational agency (or, in the case of a district-wide assessment, the local educational agency) shall, to the extent feasible, use universal design principles in developing and administering any assessments under this paragraph” (Baker, 2004). This study also examines the systemic changes necessary for successful implementation of UDL into teacher practices.

Statement of the Need

The catalyst for this study is the seemingly ever-present issue of inaccessibility of information in educational curriculum. With the federal mandates of NCLB and IDEIA 2004, and the integration of UDL principles into curriculum design throughout the United States, it is unclear how these adjustments to teaching practices affect teachers. It is also

unclear as to whether teachers perceive UDL to have any significant improvement on teaching and learning, and what systemic changes are necessary for implementation of UDL into curriculum.

Research Questions

The impetus for this study is that most curriculum design creates a learning environment with information that is inaccessible to individuals with disabilities. Curricula incorporating UDL principles claim to remove the barriers that create the inaccessibility to information. The questions, therefore, are for those implementing universal design for learning principles into curricula:

1. What are teacher perceptions of universal design for learning during the implementation process?
 - a. What concerns do teachers have during the implementation of UDL?
 - b. How has UDL influenced lesson planning?
 - c. How has UDL influenced lesson presentation and student engagement?
 - d. What changes have taken place during the UDL implementation process?
 - e. What has helped maintain the change?
 - f. What successes and obstacles do teachers encounter during the implementation process?

The administrative decision to facilitate the change in curriculum design entails systemic changes that must take place within the school and/or district.

2. What systemic changes need to take place in order to implement UDL principles?

- a. What procedural changes occur?
- b. What physical/entity changes occur?
- c. What obstacles do administrators encounter during the UDL implementation process? What are the concerns?

Significance of Study

The research on universal design for learning is limited; mostly studies highlighting the potential effectiveness of universal design for learning practices. There is a need for research studies, both qualitative and quantitative, that describe teacher perceptions of UDL. Deeper mining of literature shows that there is a link between the founders of universal design for learning concept, the Center for Applied Special Technology (CAST) and many of the research studies and articles supporting universal design for learning (Coyne et al., 2006; Dalton, 2000; Dalton, Morocco, & Tivnan, 1997; Dolan et al., 2005; Hitchcock, Meyer, Rose, & Jackson, 2002; Hitchcock & Stahl, 2003; Proctor et al., 2007; Rose & Dalton, 2006; Rose & Meyer, 2002, 2006; Rose, Meyer, & Hitchcock, 2005).

CAST has been instrumental in the revision of IDEA and through the support of the U.S. Department of Education, Office of Special Education Programs (OSEP), assisted in drafting the National Instructional Materials Accessibility Standard (NIMAS) which sets the standard for developing and distributing digital materials. At the time of this writing, CAST also leads OSEP funded National Instructional Materials Accessibility Centers (NIMAC), and works with state and district stakeholders to apply UDL into teacher practices. In 2009, CAST founded the National UDL Center to assist in

the implementation of UDL by providing resources, information, and communication regarding UDL through blogs, resource repository, and current news regarding UDL (CAST, 2010).

There is a need for additional research outside of the CAST realm. CAST is considered by most to be the experts in UDL and the tentacles of CAST training reach nationwide. Assumption is then that the CAST training has created other experts in UDL who may no longer have ties to CAST or have minimal contact with CAST.

This research study will add to the literature on UDL without ties to any organization linked to CAST. This UDL study was conducted independent of CAST. This study will also add to the foundation of literature for future researchers by setting the framework for additional studies regarding teacher perceptions of UDL. Not only will future researchers benefit from this information regarding UDL, there may be benefits to the local education agencies (LEA) and student learning as well.

For LEAs, the initiation of a new curriculum framework is wrought with systemic changes (Rose & Meyer, 2002). LEAs will gain insight into the systemic changes that are necessary for implementing UDL. For example, just as the templates provided by Concord School District may assist administrators in what systemic changes to anticipate as they consider the implementation of UDL principles into the local curriculum design, so will the documentation of the systemic changes revealed through the results of this study. LEAs will also gain insight for professional development topics. Educators may also benefit from the documentation of teacher perceptions of UDL. While not all teachers will perceive UDL the same way, it is helpful to know what they have

encountered and the reactions, perceptions, celebrations and struggles that may have risen with the implementation of UDL. There is anticipation of learning what strategies the teachers have found to improve the learning environment.

Future researchers can build upon the information from this study by examining teacher perceptions of UDL through longitudinal study. Researchers can also investigate the role teachers have in decisions made regarding the implementation of UDL. Likewise, researchers can examine possible stereotypical perceptions amongst various groups of teachers, like new teachers versus experienced teachers, bi-lingual versus mono-lingual or general education teachers versus special education teachers. Some researchers may also examine student perceptions of learning with lessons embedded with universal design principles. In the end, the information provided will assist in adjusting teaching practices that will ultimately benefit students and the learning environment.

“The field of special education should heed caution as it relates to the notion of universal design. Without empirical evidence and carefully designed approaches to the study of the outcomes of UD applied to educational environments, there is a danger of embracing the UD concept at the expense of a rigorously crafted agenda to examine its efficacy” (McGuire et al., 2006, p. 171). This study fills a gap in research regarding teacher attitudes and perceptions during the implementation phase of UDL. This study provides teachers and educational administrators with recommendations for UDL teacher in-services, and a close look at the efficacy of UDL after the first-year implementation.

Proposed Method of Study

This study will be comprised of both qualitative and quantitative components. All participants will be adult volunteers. The observation checklist and survey will comprise the quantitative portion of the study. Teacher and administrator interviews will provide qualitative data. The study methods, variables, and measurement procedures are detailed in Chapter III.

Summary

The curriculum in our schools remains inaccessible to many students. Through federal mandates and civil rights movements, numerous legislative acts have attempted to equalize the access to education and information for all students. Most recently, NCLB and IDEIA 2004 brought this issue into the limelight. Yet despite federal mandates, appropriate education and accessible information remain out of reach for many students. Some states have supported the federal initiative of UDL and mandated the use of UDL principles to assist districts in creating a more accessible curriculum. Since UDL implementation is not, at the time of this writing, a federal mandate, it has not yet been acknowledged by most local education agencies. Since most persons in the field of education consider UDL a paradigm shift in teacher practices, this study proposes to examine teacher perceptions of UDL during its implementation phase.

Organization of Paper

Chapter I introduced the reader to the contents of this paper, giving background information of universal design for learning and its relation to brain research, educational theory of Lev Vygotsky, federal mandates regarding current education of students and

learning outcomes. The reader was also presented the historical background of education and the inaccessibility of education for many children. The reader was shown how historical events have affected access to education and educational goals as well as the historical governmental involvement in education. This chapter also presented a rationale for this study and an overview of the organization of the remainder of this paper.

Chapter II contains an extensive literature review. The reader is first presented with a summary of Chapter I. Then, current research in education pertaining to accessible curriculum, technology in the classroom and UDL will be discussed. A brief discussion on systemic change will conclude Chapter II.

Chapter III is a description of the methodology proposed in this research study. The selection of participants, the survey, UDL observation checklist, and interview protocols used, as well as the transcription of audio will be discussed at length. The data analysis and software application used in the analysis of data is more thoroughly discussed in Chapter III. The procedures for this study are explained in detail as well. Chapter III also discusses any threats to the validity of this study.

Chapter IV includes the research results. A descriptive narrative of the analysis, and tables and charts depicting quantitative data are included in this chapter. This chapter describes how the data were sorted, coded, and analyzed. General conclusions are discussed in Chapter IV.

Chapter V answers the research questions, discusses generalizations of findings and implications this study has for teaching and learning, and makes recommendations for future studies.

CHAPTER II

LITERATURE REVIEW

Summary of Inequity in Education

Historical Perspective

For centuries, America has sought to educate children in a way deemed fit for entering society and contributing to the community. Education has been influenced by societal expectations and standards, religious influences, population explosions, wars, and legislation. What has resulted is a flux definition of who should be educated and for what purpose, thereby creating inequalities of educational opportunities for many children, especially children with disabilities. Without disregard to the paradigm shifts within the American educational system as a whole, the focus here is more specific; the changes that took place in the education of children with disabilities and their disproportionate, often unequal education as compared to same aged peers.

During the colonial time period the individuals identified as having disabilities were of the more severe nature. Individuals with milder disabilities often went unnoticed. Children with learning disabilities or mild mental impairments often took on apprenticeship jobs in the cities or they lived in rural areas where life was considered slower paced.

Colonial families took the role in educating children with disabilities. In many communities, children with more severe disabilities were often left to die because they

were seen as an abomination to God. There were, although, more benevolent communities who cared for individuals with disabilities by supplying them with basic food, clothing, and shelter. Some children with disabilities were institutionalized if the family could no longer care for them.

Institutionalization of children with disabilities gained momentum as researchers and scientists reported successfully educating or training individuals with disabilities for apprenticeship. However, as enrollment increased in the institutions, the education of the patrons declined in that the institutions became more like warehouse conditions than educational institutions. With debilitating institution conditions and the rise of adherence to the compulsory attendance law, parents began to enroll their children into the public schools.

By the time America reached its 100th year of independence, legislation for compulsory attendance was ratified in many states. Although initially impacting schools only slightly, the compulsory attendance laws brought more children into the public schools, including children with disabilities. Many children with mental impairments, physical impairments or severe learning disabilities were not able to keep up with the rigor of the typical curriculum. Eventually, schools sought a more functional-based and vocational-trade-based education for those students performing below expectations of the regular curriculum. Separate rooms or even separate facilities were required to house the equipment needed to provide a functional-based or trade-based curriculum.

Legislation to Support Equal Opportunity

By 1965, the Civil Rights Act of 1964 brought a legal end to segregation by race and as a result, a great educational chasm appeared between ethnic groups, especially for those of the lower economic class. Subsequently, the 1965 Elementary and Secondary Education Act (ESEA) was signed into law. The ESEA allocated funds to school districts to improve or develop reading programs for children from poor families.

Spurred by the Civil Rights movement, the 1973 Rehabilitation Act and the 1975 Education for All Handicapped Children Act (also known as P.L. 94-142) were enacted to protect the rights individuals with disabilities. Education for students with disabilities became guided by the individual education plan (IEP) with a free and appropriate education (FAPE) in the least restrictive environment (LRE). The 1990 Americans with Disabilities Act (ADA) prohibited discrimination based upon a disability and guaranteed equal opportunity for individuals with disabilities, including the public school arena. The 1975 P.L. 94-142 was renamed in 1997 to Individuals with Disabilities Education Act (IDEA) to stress the importance of the individual. Now, when referring to anyone with a disability, whether in writing or conversation, the individual is named before the disability. IDEA also required the consideration of assistive technology for students with disabilities. Assistive technology was defined in terms of devices and services. As defined in the Assistive Technology Act of 1998, the term ‘assistive technology device’ means: *Any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities* [italics added] (1998, sect. 3.a.3). Likewise,

the term 'assistive technology service' means: *Any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device* [italics added] (1998, sect.3.a.4). Detailed descriptions of assistive technology services and definitions can be found in Public Law 105-394 November 13, 1998 112 STAT. 3627, section 3. For purposes of this writing, the general definitions above will suffice.

The rights of students with disabilities appeared infringed upon with the most recent reauthorization of ESEA, the No Child Left Behind Act of 2001 (NCLB). While NCLB sought to improve performance on standardized testing by increasing accountability, IDEA sought appropriate educational opportunities and mastery of educational goals as defined by the students' individual education plans (IEP). An irrefutable incompatibility remained between the laws.

IDEA was subsequently reauthorized in 2004 to the Individuals with Disabilities Education Improvement Act (IDEIA 2004) to realign itself with NCLB. IDEIA 2004 included the use of universal design in education to help bridge the divide between the laws. IDEIA 2004 added the use of universal design principles, to the extent feasible, in developing and administering state, district or local assessments (Baker, 2004; Wright, 2004). Universal design is defined in the Assistive Technology Act ("Assistive Technology Act", 1998) as:

...a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are

directly usable (without requiring assistive technologies) and products and services that are made usable with assistive technologies (sect.3.a.17).

Universal Design Applied to Learning

The Development of Universal Design for Learning

The universal design for learning (UDL) concept was born at the Center for Applied Special Technology (CAST) in Massachusetts in 1984. One intent of CAST was to “develop and apply technologies that would expand learning opportunities for individuals with disabilities” (Rose & Meyer, 2002, p. v). The initial goal of the CAST founders was to outfit students with the technology necessary to access the curriculum information. CAST’s mindset at the time was that students should take the responsibility of adjusting their learning environment in order to access curriculum information. The idea of outfitting each student with the necessary equipment was eventually deemed an insurmountable task. The team needed a new mindset. CAST underwent “a Copernican shift toward a new position” (Rose & Meyer, 2002, p. v).

Rather than asking the students to make the adjustments to accommodate their learning needs through the use of individualized or specific equipment, the CAST team set out to find a way to make adjustments to the curriculum. The answer came with a more universally designed curriculum. Taking the idea from universal design in architecture, CAST explored the possibility of applying similar principles to teaching and learning: “Conceiving, designing, and delivering a curriculum that will accommodate widely varying learner needs, and thus, transferring the burden of adjustment from the student to the materials and methods they encounter in the classroom” (Rose & Meyer,

2002, p. v). Making the curriculum adjustable or flexible enough to meet the needs of a variety learner differences was the foundation for establishing UDL at CAST.

UDL asserts that by writing curricula with a more universally designed approach, the curricular information becomes more accessible. Curricula designed with UDL means that instructional methods and materials should meet the needs of a wide variety of students (Rose & Meyer, 2002). “The belief is that universal design may be the paradigm that can promote the effective implementation of inclusion and provide access to the general education curriculum” (McGuire et al., 2006, p. 167). UDL implies that curriculum and instructional design should be *smart from the start* by removing barriers that are inhibiting access to the curricular information (Pisha & Coyne, 2001).

UDL: The Barrier-Buster

Many students find barriers to learning when information is presented to them through a print-based textbook. Recognized authors assert that there are barriers to accessing general information in education and the single greatest barrier for many students is the printed text (Edyburn, 2005; Pisha & Coyne, 2001; Rose & Meyer, 2002; Rose et al., 2005). There is no discounting the usefulness of the printed text, for it has its advantages. Printed text is permanent, provides a lasting, accurate record of the past, and helps “communicate information more exactly” (Rose & Meyer, 2002, p. 53). The disadvantage or limitation of printed text is the inherent rigid format that makes printed text inaccessible to many learners, especially for individuals with vision or physical impairments, or for individuals with reading, learning and other disabilities (Edyburn, 2005; Pisha & Coyne, 2001; Rose & Meyer, 2002). Rose et al. (2002) provided a sample

Curriculum Barriers Model Template and Examples of Prevailing Methods and Materials to “help analyze the potential barriers inherent in curriculum materials and methods” (pp. 184-185). The UDL framework suggests having instructional and support tools, like textbooks along with supplemental workbooks, which are more versatile, allowing for a more differentiated learning environment. Rose & Meyer (2002) posited that “UDL supports differentiated instruction” (p. 7).

Differentiated instruction incorporated into teacher practices allows students multiple options for learning the information presented through ongoing assessments and frequent scaffolding of information (Tomlinson, 1999). Students in a reading lesson, for example, are at varying levels of understanding when discussing the lesson concept. “Providing adjustable levels of challenge [helped to] sustain student engagement” in the learning process (Rose & Meyer, 2002, p. 127). However, accommodating individual needs is a daunting task for some teachers. Technology makes the task of scaffolding or accommodating for individual learner needs less daunting while at the same time, increasing engaged learning time. UDL supports the use of flexible support tools, like technology-supported tools. UDL tools are most commonly found in digital format due to the ease of convertibility of digital media into other formats like enlarged text, audio books, etc. (Edyburn, 2005; Rose & Meyer, 2002). Since students with disabilities often struggle with a traditional hardbound textbook, whether due to vision impairment, physical impairment, or reading disability, having access to digital format of the textbooks allows these students better access to the curriculum.

UDL and Brain Research

Brain Research and the Learning Process

Shaywitz and Shaywitz (2004) and Shaywitz et al. (2006) found that individuals with reading disabilities, particularly teens and adults with dyslexia, use different areas of the brain to decode words and comprehend passages, compared to non-impaired individuals. Functional magnetic resonance imaging (fMRI) allows real-time imaging of the brain as it processes information and has revealed that there is a difference between the images of non-impaired individuals and individuals with dyslexia.

Each UDL principle is built upon how information is processed during learning activities and the three guiding principles of UDL are the basis for creating a more accessible curriculum (Rose & Meyer, 2002, 2006). Before discussing the UDL principles, it is necessary to understand what brain research revealed regarding neural activity during the learning process. Positron Emission Tomography (PET) brain scan images and fMRI of individuals given the same task, reveals differences in brain activity. The neural networks in the brain, although generally similar, have varying degrees of differences while completing specific tasks. Rose et al. (2002) identified “three primary brain networks by terms that reflect the network functions: the *recognition*, *strategic*, and *affective* networks” (p. 12).

The *recognition network* of the brain receives and analyzes information, and recognizes patterns such as familiar faces, decoding phonetic patterns, and words in context. “Although human brains all share the same basic recognition architecture and recognize things in roughly the same way, our recognition networks come in many

shapes, sizes and patterns” (Rose & Meyer, 2002, p. 17). Although PET scans may show the same area of the brain with increased activity during the recognition learning process, “the exact magnitude, location and distribution of the increased activity varies quite a bit” (Rose & Meyer, 2002, p. 18). The differences in brain activity from both PET scans and fMRI support the need for presenting information through multiple means, the first UDL principle (Coyne et al., 2006; Rose & Meyer, 2002).

The *strategic network* plans and executes actions while processing information. Much of what we do repetitively might be processed through the strategic network of the brain. For example, when learning to ride a bike, you first observe the entire process of someone else riding. When it is time for you to learn, the steps to riding the bike are broken down and you concentrate on each one until mastered. As you practice, the process becomes easier to a point that you can get on a bicycle and ride without thinking of each step independently; it becomes a more automated action. Similarly, as you listen to a lecture, you take notes of the important points. However, when you were first asked to take notes, you probably tried to write down everything the teacher said. The process eventually became a more learned, strategic process. Much like the recognition network, there are learner differences within the strategic network. Not all students will take notes in the same manner, solve a problem using the same steps, or compose exactly the same essay. These differences support the need for the second UDL principle: provide multiple, flexible methods of expression (Coyne et al., 2006; Rose & Meyer, 2002).

The *affective network* evaluates priorities, and selects actions to complete a task. The affective networks “process different kinds of emotional information simultaneously

and communicate closely through myriad interconnections to create a whole affective impression” (Rose & Meyer, 2002, p. 32). Emotional responses and stimuli create the affective processing inherent in the learning process. Like the recognition and strategic networks, the affective network differs for each individual. “Affective differences exert powerful influences on learners’ ability to engage with learning and to progress” (Rose & Meyer, 2002, p. 34). Knowing that the affective network influences a learner’s ability to engage in the learning process, the third principle of UDL supports the need to address the affective network: provide multiple, flexible options for engagement (Coyne et al., 2006; Rose & Meyer, 2002).

UDL Principles Related to Brain Networks

The UDL principles support the triad of learning networks and what brain research imagery revealed about learner differences. UDL principles “advocate a particular teaching approach for supporting learner differences in recognition, strategy, or affect” (Rose & Meyer, 2002, p. 74). Each principle supports the notion of creating a learning environment with minimal to no barriers to information in the curriculum. Rose and Meyer offered examples of “UDL solutions to anticipated barriers” in *Deriving UDL Solutions Model Template and Examples of UDL Solutions*, each citing examples for UDL solutions dealing with the three brain networks (pp. 190-193).

Coyne et al (2006) stated, “UDL offers three guiding principles for developing curricula that eliminate barriers to learning, build on strengths, and allow different ways to succeed...in practical terms, these principles are applied to all facets of instruction, including learning goals, methods, assessment, and materials” (pp. 3-4). Rose and Meyer

(2002) stated that “the three UDL principles share one common recommendation: *to provide students with a wider variety of options*” (italics in original, p.74). The UDL principles listed by Rose and Meyer (2002, p. 75) are:

- Principle 1: To support recognition learning, provide multiple, flexible methods of presentation.
- Principle 2: To support strategic learning, provide multiple, flexible methods of expression and apprenticeship.
- Principle 3: To support affective learning, provide multiple, flexible options for engagement.

Principle 1, providing multiple, flexible methods of presentation of information means that teachers include multiple ways of presenting a lesson or unit so that the information is accessible to the greatest variety of learners possible. One way is to offer audio books along with the hard print editions. Principle 2, providing multiple, flexible methods of expression and apprenticeship means that students should be given options to demonstrate the acquisition and synthesis of the information presented. One way is to offer project-based, oral reports, essays or multiple choice assessments. Principle 3, providing multiple, flexible options for engagement means that teachers offer choices to students to encourage their participation. One way is to make connections between prior knowledge and the current activity.

By having the flexibility to support various learner needs, UDL reduces or eliminates barriers to the learning process and supports the recognition, strategic and affective learning networks of the brain. Additionally, UDL supports Vygotsky’s ZPD by

continuously facilitating engagement with teacher guidance during the learning process. The UDL concept also supports the NCLB notion that students can succeed, while upholding the FAPE of IDEIA 2004 through a universal access to education and the use of UDL principles in lesson planning.

The Research Literature

Literature confirms that universally designed curriculum would be not be possible without the use of technology; it is the convertibility of utilizing digital text that made technology integration most prevalent in UDL planning (Edyburn, 2005; Pisha & Coyne, 2001; Rose & Meyer, 2002). Most recently, (at the time of this writing), stimulating discussions have surfaced regarding the level of use of technology with curriculum designed with UDL (Edyburn, 2010; King-Sears, 2009). The reader should generate his or her own position at the conclusion of this paper. Since there was not an extensive list of UDL research to review, and the use of technology is most prevalent in UDL planning due to its flexible design, as indicated previously, select research using instructional technology with students with disabilities is included in this review of literature.

Technology and UDL

Overall, the literature reviewed indicated that students in a more controlled, guided learning environment with the added ability to manipulate the learning tools to meet their individual needs, met with greater success overall than those who experienced learning through the traditional teaching practices (Calhoon, Fuchs, & Hamlett, 2000; Dolan et al., 2005; Gulek & Demirtas, 2005; Hollenbeck, Rozek-Tedesco, Tindal, & Glasgow, 2000; Kelley, Finley, Koehler, & Picard, 2001; Levinson, Weaver, Garside,

McGinn, & Norman, 2007; Molebash & Fisher, 2003). Students with disabilities in particular showed more achievement gains when paired with activities or technology designed to guide them through the tasks or when UDL principles were applied to lessons and worksheet design (Acrey et al., 2005; Dolan et al., 2005; Ferretti & Okolo, 1996; Knight & Knight, 1995). Furthermore, the use of technology in teaching and learning was only effective if the user could navigate the technology efficiently and teachers had adequate knowledge of the technology for proper integration into lesson planning (McGuire et al., 2006; Puckett, 2004; Sapp, 2007).

Technology in Education

Computers increased student engagement in the learning process. Knight and Knight (1995) examined the role computers played in the learning process. The use of computers increased the ability to differentiate lesson planning and students were more engaged in the learning process with the use of computers. Sapp (2007) concluded that when designing or choosing software for use by individuals with disabilities, the usability (user friendliness) of the application was just as important as its accessibility features. Engagement in the learning task was better if the students knew how to navigate the software. Students with vision impairments were more engaged in the learning process as they completed tasks with the support of adapted technologies, like screen readers or magnification software (Kelley et al., 2001). Within a classroom, the level of technology awareness varied between students and often created classroom management issues (Kelley et al., 2001). Teachers also had to troubleshoot when technological software issues arose. Yet, the use of technology in the learning environment increased engaged

learning time despite the classroom management problems and continuous troubleshooting of the software (Kelley et al., 2001).

Critical issues arose when integrating technology into the learning process (Kelley et al., 2001). Teachers required basic/essential training on the use of the technology, an understanding of whose responsibility it was to maintain the technology, and where to locate the technology resources. Introducing technology use in the classroom in elementary grades and in-class training of staff and students was critical for technology integration to be successful (Kelley et al., 2001). Similarly, allowing students the time to become skilled with the technology increased the likelihood of the successful integration of technology into the learning environment (Kelley et al., 2001).

Teachers need to be knowledgeable of the technology used in the teaching and learning process (Puckett, 2004). The findings in Project ACCESS, concluded that before training, “the majority of teachers reported no knowledge or minimal awareness of Assistive Technology applications in seven of eight categories” (Puckett, 2004, p. 9). However, after completing the teacher training, 70-80% of the teachers felt they would sometimes or even frequently use the technology to assist students in accessing the curriculum or in facilitating the learning process.

Several studies found an increase in engaged learning time when teachers or peers facilitated the learning process. Ferretti and Okolo (1996) revealed that when students were involved in project-based learning, they were more engaged in the learning process when the task was teacher facilitated or when teachers or peers problem-solved along with the students. “Learning awakens a variety of internal developmental processes that

are able to operate only when the child is interacting with people in his environment and in cooperation with peers” (Vygotsky, 1978, p. 90).

Eliminating barriers to information with and without the use of technology increased student performance on math performance test scores and writing outcomes for secondary students with learning disabilities (Calhoon et al., 2000). The study included computer-based accommodations and non-computer-based accommodations. The study compared a computer-based text to speech application, a computer-based text to speech with video, and the administration of performance math tests through typical administration procedures. There was a significant increase in performance math scores over typical administration of test when using a human reader or computer-based text to speech. There was no significant difference between a human reader, computer-based text to speech, or computer-based text to speech with video. The secondary students with learning disabilities performed significantly better when the test items were read aloud. So, the elimination or minimization of a barrier (printed text), and the reading of test items in the Calhoon et al. study, significantly improved test scores for students with learning disabilities.

A pattern in performance indicated that students with lower computer skills may have been at a disadvantage when using the technology-based assessment (Higgins, Russell, & Hoffman, 2005). Higgins et al. stated there were “differences in performance when two different computer-based test formats and a traditional paper-and-pencil based format were used to present reading passages to 4th grade students...[but] there were no significant differences in reading comprehension scores across testing modes” (pp. 6, 30).

Students who had lower computer skills were at a disadvantage when taking a computer-based test with a scrolling feature, but still preferred to take a computer-based test over pencil-paper-based test (Higgins et al., 2005).

Students in general education who participated in a laptop immersion program scored higher in writing, math and overall grade point averages (GPA). Gulek and Demertas (2005) found “that students who participated in the program tended to earn significantly higher test scores and grades for writing, English-language arts, mathematics, and overall GPAs” (p. 29). Students who were able to interface easily with the technology improved their test scores (Gulek & Demirtas, 2005).

Hollenbeck, Rozek-Tedesco, Tindal and Glasgow (2000) found that despite differential access, students with disabilities did not perform as well as non-disabled peers on assessments. Students without disabilities outperformed students with disabilities on large-scale math tests. One particular factor may have played a detrimental role in the results of the study. Students with disabilities may not have had the conceptual math knowledge to complete the math test nor adequately use the accommodations for the testing situation. Students with disabilities made many pattern errors and misapplication of formulas and strategies during the test. There was, however, an increase in test performance when the testing conditions were student-paced over teacher-paced. Those who utilized student-paced accommodation outperformed those who completed the teacher-paced test. Differential access to test accommodations resulted in increased test scores when students were allowed to self-pace. It was imperative to match

an accommodation to the student's knowledge and performance skills (Hollenbeck et al., (2000).

Dolan et al. (2005) examined test outcomes of high school students with learning disabilities using traditional paper-pencil test versus a computer-based test with text-to-speech option. The results indicated a significant difference in test scores for U.S. History and Civics tests, and in reading passages in excess of 100 words, but no statistically significant difference was found in shorter passages. Students with learning disabilities typically experienced difficulties in reading and became easily frustrated in school, particularly when there was pressure to succeed, like during an assessment. Allowing a computer to read the text rather than the student with learning disabilities struggling to decode the text, would enable the student to concentrate on the assessment. Computer-based text-to-speech minimized or even eliminated the obstacles that impeded the interpretation of information for individuals with learning disabilities or reading disabilities

Students who use technology in the learning process "often come to a better understanding of the content being learned as they play a role in solving problems" (Molebash & Fisher, 2003, p. 65). However, when students were learning independently or had minimal teacher guidance, technology did not improve the learning process. Even for individuals with greater technological navigation skills and a higher familiarity with the computer, students without teacher guidance on Internet-related activities actually learned less than the students whose computer knowledge was lacking (Wecker, Kohnlet, & Fischer, 2007). Advanced users of the Internet acquired the skill of quickly separating

information found online into categories of useful and not useful information, by skimming or browsing through the information. Wecker et al. described this as a more shallow processing of information, which was less functional for learning. Wecker et al. attested the importance of adult or peer guidance in the learning process.

The learner's environment and presentation of information must be controlled (Levinson et al., 2007). When presented with a selection of multiple ways to receive information, the high degrees of learner control hampered student learning. For learners with poor spatial ability, having a selection of multiple ways to engage in a task actually negatively impacted their learning. So having multiple methods of presenting information is non-productive unless the learning process was "adult guided or in collaboration with a more capable peer" (Vygotsky, 1978, p. 86).

Students who used the e-text version of a novel showed a significant difference in reading comprehension gain scores over users of a print-based version of the same novel (Dalton, Pisha, Eagleton, Coyne, & Deysher, 2006). Students in this study indicated they read more and stayed in focus with the text more when using the computer-based learning strategies. While the electronically embedded assistant was designed to guide them through the text, students stated that the e-assistant lacked specificity in directives and cues. Students also found the individualized digital reading helpful. Students using the digital-based novel also spent more time engaged in feedback activities than those students completing feedback activity tasks through typical teaching practices. The digital-based activities were embedded into the novel study program, which controlled the learner's technology engagement opportunities.

Applying UDL Principles

Meo (2008) identified a planning process, called Planning for All Learners (PAL) for “developing and delivering lessons with UDL principles” (p. 24). PAL was a four-step process to assist teachers in setting up a more universally designed lesson or unit of study. Participants utilized several CAST forms found in “Teaching Every Student in the Digital Age” (Rose & Meyer, 2002). Through the 2008 CAST study, Meo stated the importance of teachers adopting UDL principles into their teaching practices, as well as the value of teaching comprehension strategies within subject-area content. Altering lessons to make them more accessible using the “elements of universal design was simple and intuitive” (Acrey et al., 2005, p. 23). Teachers “reported better on-task behavior and better comprehension of materials” when universal design principles were applied to social studies guides and classroom assessments (p. 26).

Systemic Change and UDL

UDL has been thought of to be a paradigm shifting concept in the teaching and learning process (McGuire et al., 2006; Molebash & Fisher, 2003). Several states have embraced the notion of using UDL principles to guide curriculum design and teaching practices and have implemented systemic change. “State policies can have a profound impact on facilitating or impeding systemic change to learner-centered, customized education on the district and school levels” (Christie, 2006, p. 29). Furthermore, Holzman (1993) defined the systems structure of systemic change so that “efforts to improve education must be consciously systematic...anything less than a systematic approach will find the fabric of change unraveling at one end even as it is being woven at the other” (p.

18). The systems approach to change leaves no one out, working with all stakeholders, having both top-down and bottom-up policy making. “When all parts are pulling together reform will happen” (Olson, 2002, p. 129).

There is evidential need to address systemic change during the implementation process of UDL. The August 2008 research summary of the National Implementation of Response to Intervention (RtI) stated that three years after RtI was mandated, 28 states were implementing RtI and 16 were considering implementation to some extent (Hoover, Baca, Wexler-Love, & Saenz, 2008). The remaining states were either not implementing or just did not respond to the data inquiries. The results of the research suggest further inquiry into the variations of implementation across states, the barriers the states faced during implementation, models used for training and the effects of those trainings, educator roles in RtI, and more. It stands to reason, then that with the implementation of UDL and the inherent systemic change, teacher roles should be defined as well as the effects of the current UDL training models. As systemic change toward UDL appears through several state-wide initiatives, the mention of the use of UDL for assessments in IDEIA 2004, and the collaboration with OSEP stressing improved access to general education, the concerns, expectations, and perceptions of teachers and administrators who have experienced the implementation of UDL is invaluable.

One piece of literature on administrative attitudes toward the systemic change of UDL surfaced during the inquisition of related literature. Abell (2006), in his doctoral study, examined administrative “attitudes and factors valued by Directors of Special Education (DOSE) implementing a Universal Design for Learning (UDL) initiative

within special education programs across Kentucky” (p. 1). Although DOSE perceived that “special education teachers see the value and work to promote and integrate UDL/E-text into special education and regular education classrooms” the current “technology infrastructure and existing computers within districts are having a negative impact on the deployment and utilization of UDL/E-text” (Abell, 2006, p. 143). Additionally, DOSE noted there is a cost-factor that “plays an important role” (p. 144) which is “seen as a financial burden” (p. 149) considering current budgetary cut-backs. The information Abell provided sets the foundation for administrative inquiries in this study.

Summary

The implementation of universal design into the teaching and learning process has required a paradigm shift in teaching practices (new skills, knowledge, and philosophy) as well as in learning strategies (Acrey et al., 2005; McGuire et al., 2006; Meo, 2008; Molebash & Fisher, 2003). A paradigm shift necessitates systemic change at state, district and local levels (Abell, 2006; Christie, 2006; Holzman, 1993; Hoover et al., 2008). During the implementation of UDL, technology was often used due to its ability to convert text into multiple formats (Dolan et al., 2005; Edyburn, 2005; Pisha & Coyne, 2001; Rose & Meyer, 2002). Technology has been a barrier-buster for individuals with disabilities, but also a hindrance if the user cannot navigate the technology itself or have guidance while using the technology (Calhoon et al., 2000; Dalton et al., 2006; Higgins et al., 2005; McGuire et al., 2006; Sapp, 2007). However, technology for learning alone did not assist individuals with disabilities (Hollenbeck et al., 2000; Wecker et al., 2007). Teachers must understand the technology and its integrative purpose, and become the

facilitator in the learning process in order to keep students actively engaged in learning (Ferretti & Okolo, 1996; Kelley et al., 2001; Levinson et al., 2007; Puckett, 2004; Vygotsky, 1978; Wecker et al., 2007).

It is imperative that we know what the books do not tell us: teacher perceptions of universal design for learning during its implementation phase, the endeavors teachers may encounter and the stories they experienced during systemic change, what administrative decisions were needed to facilitate the change, and any barriers the stakeholders must overcome during the implementation process of UDL.

Rationale

Since UDL is specifically identified in IDEIA 2004 to address the obligation of educational agencies to “the extent feasible, use universal design principles in developing and administering any assessments” (Wright, 2004, p. 22), teachers and administrators alike should be informed on what is to be expected when their district begins implementation of UDL. This study examined perceptions teachers have of UDL during implementation along with any systemic changes that are necessary for UDL implementation. Researching the perceptions of teachers and administrators new to the UDL process assists others in knowing what to expect when UDL is implemented in their district or school. Gaining first-hand perspectives from fellow teachers contributes to the professional development of teachers beginning the implementation of UDL. “The time is right for the field of special education to articulate a research agenda that includes collaborative efforts to examine the application of UD to educational environments, so that the history of failed practices does not repeat itself” (McGuire et al., 2006, p. 172).

CHAPTER III
RESEARCH METHODOLOGY

Statement of Problem

Historically, children with disabilities in the United States were not given the same educational opportunities as other children, as many were not educated at all. Education was seen as preparation for an individual's niche in the community and how that individual would be of service to others. Society viewed individuals with disabilities as uneducable and unable to contribute to the community at large and thus, were rarely given opportunity for an education. As societal views of education changed, so did educational opportunities for children with disabilities. By the twentieth century, a series of federal mandates supported the education of children with disabilities and focused on meeting the individual needs of the child. At the same time, federal mandates for the general population of students focused on improving education for all students. Eventually, these two political streams collided. Students with disabilities were expected to perform with the same progress as their peers, on the same test measure. Districts felt the pressure of what seemed an insurmountable task: meet the mandated progress levels for all students or suffer the consequences. In a scramble to meet the federal requirements, districts initiated intervention programs and increased professional development for their staff. Some districts looked to change the way curricula were designed.

The theory of universal design for learning is one idea for bringing about curriculum change. However, little is known of what teachers experience or the concerns they have during the integration of universal design for learning theory into the teaching and learning process. There was also the need to unveil the systemic changes that occur during the transition to implement universal design for learning (UDL).

The purpose of this research was to explore teacher perceptions of UDL during the implementation phase and to investigate the systemic changes needed for the implementation of UDL into curriculum.

Overview

This chapter describes the selected methodology, rationale, and methods of study of the research questions:

1. What are teacher perceptions of universal design for learning during the implementation process?
 - a. What concerns do teachers have during the implementation of UDL?
 - b. How has UDL influenced lesson planning?
 - c. How has UDL influenced lesson presentation and student engagement?
 - d. What changes have taken place during the UDL implementation process?
What has helped maintain the change?
 - e. What successes and obstacles do teachers encounter during the implementation process?
2. What systemic changes need to take place in order to implement UDL principles?

- a. What procedural changes occur?
- b. What physical/entity changes occur?
- c. What obstacles do administrators encounter during the UDL implementation process? What are the concerns?

Methodology

Qualitative and quantitative methods were used for this study. This two-part study used a combination of observation, interviewing, and survey to describe, explain, and depict relationships among and between variables regarding the integration of universal design for learning into the teaching and learning process. The research focus was on teachers' perceptions of and experiences with universal design for learning during varying years of implementation.

Rationale

Rationale for Observation Component

Classroom observations represented the first half of Part One of the study. The observations verified that UDL was being integrated into the teaching and learning process in the classrooms of participants who were later interviewed. Two observations per teacher were completed for most teachers. The researcher was looking for repeated performance of UDL in the classroom, no matter what the conditions. Classroom observations not only indicated whether or not the teacher was demonstrating UDL, but also afforded a basis for more comprehensive discussion during the teacher interviews.

Rationale for Interview Component

The interviews represented the second half of Part One of the study. Interviews were conducted because dialogue provides a broad and deep input into the viewpoints of individuals who experienced the implementation of UDL first-hand or have knowledge of the same. The interviews provided a direct representation of individual perceptions of UDL, and allowed for teachers to expand upon any concerns, successes or obstacles they encountered during the implementation of UDL, and any changes that took place during the implementation of UDL, providing further details about of their perceptions of UDL. The administrator interviews provided rich dialogue of any obstacles, concerns, or systemic changes that took place during the implementation process. The interviews were either face-to-face or telephone interviews.

Rationale for Survey Component

The survey of teachers and administrators represented Part Two of the study. Surveys provided a broad, but shallow look at issues or conditions, with minimal room for expounding on responses. The purpose for using surveys was to provide quantitative inquiry into the research, to examine teacher perceptions and the influence UDL had on lesson preparation, presentation, and student learning, and to provide a general district perception of UDL. Participants were given the survey online using Opinio, since research indicates that there is no significant difference in the results based on the medium presentation of surveys, whether paper-based or electronic (Walt, Atwood, & Mann, 2008). The survey was designed to allow participants the ability to take the survey cumulatively or separately. Both parts of the survey utilized a 7-point Likert scale for a

majority of the survey questions with restricted response questions for demographics. The 7-point Likert scale had points corresponding to the following anchors: 0 = Not relevant, 1 – 2 = Not true of me now, 3 – 4 – 5 = Somewhat true of me now, 6 – 7 = Very true of me now.

The Likert scale allowed for quantitative analysis of differences in the variables measured regarding teacher concerns, and the influence UDL has had on lesson planning, presentation, and student learning, while the demographic questions provided the ability to group variables for closer examination and analysis of key variables/constructs.

The first section of the survey assessed concerns individuals had for UDL. The second half of the survey measured teacher perceptions of UDL to include: an individual's general understanding of UDL, the application of UDL components (lesson planning, presentation, and student engagement), support for UDL, the impact of UDL, reactions to professional development, planning for individual students, and personal reflections of UDL.

Participants

District Demographics

The participating district resides in a town, population 40,000, in the heart of a Midwestern state. At the time of this study, the district was comprised of 17 schools with enrollment of nearly 11,000 students. The district began implementing UDL with one pilot school in 2003. At the time of this writing, all district schools were implementing UDL to some degree. This district was chosen for the study due to its long-term involvement and commitment to implementing UDL. There were 821 potential study

participants in the district. The participants were a representative sample of teachers and administrators from this single K-12 school district. All participants were volunteers with no monetary compensation. All participants received a description of the study, potential hazards, the right to withdraw, the anticipated outcomes, and a copy of the informed consent form, which was also prerequisite to the online survey. The actual number of participants varied for each part of the study and will be detailed within each part of the study participant descriptions below.

Observation and Interview Participants

All teachers and administrators were invited to participate in Part One of the study. The initial invitation to participate requested that teachers commit to both the observation and the interview components of the study. Additionally, interviews were conducted with two levels of administrators, one from the building level and one at a district level. The district administrator had direct influence over systemic change initiatives and participated in the implementation process of UDL at either the state level or district level. The building level administrator was involved in the UDL implementation change process in his/her respective building. The number of teacher participants for the observations was, $n = 9$ and of the nine, there were eight teachers who were interviewed ($n = 8$). There were also two administrator interviews ($n = 2$). Total number of participants for Part One of the study was 11, ($N = 11$).

Survey Participants

Potential participants for the survey were comprised of teachers and administrators from the aforementioned school district. It cannot be determined that the same individuals completed both sections of the survey so each section will be examined as a total number (N). The number of individuals who completed the Concerns-Based Adoption Model Stages of Concern Questionnaire (CBAM SoCQ) section of the survey was N = 41 and the number of participants who completed the UDL section of the survey was N = 57.

Materials

Part One: Observation and Interview Materials

The CBAM Innovation Configuration (IC) Map was discussed earlier as a potential research tool for observations, but due time constraints and regulations of the Institutional Review Board, the IC Map could not be used. A researcher-prepared, content-validated UDL observation checklist was used for the classroom observations.

The UDL observation checklist was comprised of UDL specific components and was a modified version of the Center for Applied Special Technology (CAST) Educator Checklist/UDL Guidelines v.1.0 (see Appendix A for the modifications used). Members of the CAST organization validated the content of the modified checklist, and gave permission for use with this study. The UDL observation checklist used in this study was comprised of four major categories: three of which reflected the basic UDL principles and the fourth reflected various components of curriculum and assessment. Each category had what CAST refers to as “checkpoints” or identifiers of a designated UDL principle or

category. Since the fourth category, curriculum and assessment, was comprised of multiple identifiers, the category was grouped into smaller categories for ease of observational interpretation. The operative levels were established by taking the total number of identifiers for each category separately and creating quartiles based upon the respective number of identifiers per category. The quartiles became the cut-points for the operative levels: Not Yet Evident, Emerging, Intermediate, and Advanced. For example, one category had 10 possible identifiers to check off as observed during the lesson. The cut-points for this category were 0 – 2 = Not Yet Evident, 3 – 5 = Emerging, 6 – 7 = Intermediate, and 8 -10 = Advanced. Once the operative levels were established for that category, a point value was assigned based upon the resultant operative level: Not Yet Evident = 0, Emerging = 1, Intermediate = 2, and Advanced = 3. So, if an observation had a raw score a “6” the operative level would be “Intermediate” and as such, would be assigned the point value of “2” for that observation.

After each set of teacher observations were complete, all category operative levels were determined and the mean average operative level was figured for each observation, rounded to tenths. Note that the operative levels should be considered as a sliding bar, rather than distinct or separate levels of attainment, so that an average score of 2.3 or 2.6 could both be interpreted as an Intermediate to Advanced level. The decimal indicated how close to an operative level the average score falls, with a .5 indicating the mid-point between levels.

Each teacher interview was conducted after the classroom observations. The time of the interview for each teacher was determined based upon each teacher’s schedule and

plan time. The researcher had earlier, in email communications, requested each teacher's schedule and determined the interview time, and each teacher maintained the right to change the day and time of the interview. Most agreed to be interviewed immediately following the observations, but a few requested an interview at a later time during the week or the following week via telephone. Interviewees were not aware of the specific interview questions, but were given the topic and focus of the interview during the email discussion threads when teachers initially volunteered to participate. A digital recorder was used for all interviews. All interviews were transcribed by the researcher, using free transcription software, Express Scribe, distributed by NCH Software, and downloaded at www.nch.com.au/scribe. The Express Scribe allowed the researcher to adjust the speed of playback and set keyboard short-cuts for pausing, starting and stopping the audio.

Part Two: Survey Materials

The survey was conducted online through the secure software application, Opinio, a service provided by the Loyola University Office of Research Services. The first half of the survey was the CBAM SoCQ and the second half was a questionnaire with focus questions on UDL. The CBAM protocol was chosen because of its high reliability coefficients and established validity (George et al., 2006). The coefficients of internal reliability for each stage of the concerns questionnaire were demonstrated in several studies. The earliest study, completed by Hall, George, and Rutherford (1979) had a sample size of 830 participants and revealed the following reliability coefficients: .64 for Stage 0, .78 for Stage 1, .83 for Stage 2, .75 for Stage 3, .76 for Stage 4, .82 for Stage 5, and .71 for Stage 6 (as cited in George et al., 2006). The most recent study in 1991 by

Hall, Newlove, Rutherford, and Hord (as cited in George et al., 2006) showed reliability coefficients for each of the respective Stages 0-6 as .63, .86, .65, .73, .74, .79, and .81. The second half of the survey was researcher-prepared and reflected integral components of UDL and the research questions. Content of the UDL survey was verified by renowned experts in UDL, which was discussed earlier.

Procedure

All forms, email content, instruments, and procedures for this study were approved by the Loyola University Chicago Institutional Review Board.

Part One: Observation and Interview Procedure

An invitation to participate was sent via email to the district contact person who then forwarded the email to teachers and administrators. The invitation to participate briefly described both parts of the study. The consent to participate form was attached to the email. Those interested in Part One of the study contacted the researcher directly via email to set up observation dates and times. Each participant was emailed separately to maintain confidentiality. The classroom observations and interviews were set up by the researcher based upon individual participant schedules. Participants received the date and time of each observation and the anticipated interview date and time via email.

Part One included both classroom observations and interviews. Participants in Part One signed hard-copies of informed consent and returned the signed consent forms to the researcher before the start of the first observation. All participants had the right to withdraw at any time without penalty. During the observations, the UDL observation checklist was used to ensure UDL was operating in the classroom. The UDL observation

checklist indicated which areas of the checklist were evident in the classroom during the observation time. A copy of the UDL observation checklist was given to each observed teacher after his/her last interview so that it might serve as a UDL checkpoint. The UDL observation checklist might also serve as a guideline for future lessons or units.

The researcher completed two separate classroom observations for all but two teachers. Two observations per teacher provided the researcher with more than one estimate of operative levels for each teacher. The observations were during times that the teacher preferred, whether the observations were of the same lesson with two different groups of students, different lessons with two different groups of students, or different lessons with the same group of students. The researcher was looking for repeated performance of UDL in the classroom, no matter what the conditions. Repeated performance over time served as a measure of reliability, in lieu of a second, independent observer. Reliability percentage for consistency across observations was calculated by dividing the smaller sum score of one observation by the larger sum score of the remaining observation and multiplying by 100. Reliability percentages are reported in Chapter IV.

Before interviewing, the researcher asked each teacher how many years the building had been implementing UDL, the number of years each participant has had UDL training, and his/her years of teaching experience. Initially, the study was to interview ten participants from each of three levels of implementation, 1-year, 3-year, 5 or more years. Even though the participant sample was much lower than anticipated, the range of years of building level UDL implementation for the participants was somewhat equitable.

Three participants were in buildings that were in the first year of UDL implementation, three participants in second through fourth year of implementation, and three participants in buildings in the fifth or more years implementing UDL.

Most interviews took place immediately following the last classroom observation for the interviewee. If the teachers wished to be interviewed at a later date, they were asked to self-supply contact information. The teacher interviewees were asked questions that reflected the secondary research questions. Each interview began by letting the interviewee know that there were seven main questions that focused on UDL. The questions were not exact word-for-word for each interview, but the main idea of each remained the same. The questions probed the concerns teachers had for UDL, any successes or obstacles encountered, any changes they have experienced, the level of UDL support, professional development, and how UDL may have impacted the teaching and learning process.

The administrator participants were also contacted to schedule an interview. The administrator interviews had three specific questions that reflected the research questions for systemic change (also in Appendix B):

1. Will you describe any specific procedures, any physical or systemic changes that were required before and during the implementation of UDL?
2. During the implementation process can you describe any concerns that you encountered?
3. What do you feel teachers are doing or should be doing in order to implement UDL?

Once all interviews were completed, they were transcribed by the researcher. After downloading Express Scribe to assist with the transcription process, the researcher transferred all audio files from the digital recorder to the computer and named each audio file with the respective interviewee number given to each participant at each interview and a participant number for tracking during the interpretation of the interviews. For example, if an interviewee number was 81, the file was named P81-7, with the number P7 as the code for the interpretation write-up. The single digit identifying number helped maintain the anonymity of the interviewee. So, even if the interviewees shared their identifying interview number with others, there would be no way to identify participants in the interpretation. The audio files were transcribed with the assistance of Express Scribe software and resaved as text file documents in the same folder as the audio files. Back up copies were saved on a flash drive and stored in a secure location in the researcher's home. No one other than researcher has the password to log onto the computer used for this study.

Part Two: Survey Procedure

The survey of district teachers and administrators was the second part of this two-part study. The survey was electronically imported into the online Opinio software, linked directly from the university. An email, inviting the 821 potential participants to Part Two of the study was sent to the district contact person, who then forwarded the email to the district teachers and administrators. The email included the hyperlinks to the two-section online survey. The email described the research, any potential harmful effect, a copy of the informed consent, which included the right to withdraw at any time,

information regarding the online survey process, and the link to the online consent form and survey. Prior to taking the online survey, all participants were required to agree/accept an online informed consent to voluntarily participate or they could not proceed to the online survey. Participants responded to the survey questions anonymously, with the ability to withdraw at any time, and without penalty.

The survey remained available online for a calendar window of six weeks. Reminders via email were sent to district contact person between the third and fourth week, who then forwarded the reminder email to teachers and administrators. Participants had the option to complete both sections of the survey in one sitting or in two sittings. All questions were optional; respondents could skip any questions they did not want to answer. Lastly, there was an option for participants who were interviewed to submit their interview code number at the end of each survey. Identifying responses from those participants assisted in triangulating the data.

Data Analysis

All data were categorized and analyzed for trends in teacher concerns and perceptions of the teaching and learning process using UDL, the UDL implementation process, and the future use of UDL. The primary grouping of data was by year of implementation.

Data Analysis of Part One: Observations and Interviews

All observation data were analyzed based upon average operative levels and year of implementation. Data from the UDL observation checklists were also analyzed for patterns and relationships between and among variables and levels of implementation.

Interviews were transcribed, coded, categorized, and analyzed for viable UDL and systemic change information. After a critical review of data analysis strategies was completed with dissertation committee members, the research underwent the following process for the qualitative analysis of the interviews. Attributes of what influences perception were generated by the researcher and was used as an initial lens from which to analyze the transcripts. The first transcript was read using this lens. Data from the first transcript informed the definitions for the codes that were used to analyze subsequent transcripts and a codebook was created. The transcripts of the remaining teacher interviews were then analyzed using the codebook of *teacher perceptions*. The same process was used for the administrator interviews to develop the codebook for *systemic change*. Themes emerged as the transcripts were analyzed through the codebooks. The codebooks for *teacher perception* and *systemic change* and a more detailed explanation of the refinement of each codebook are provided in Chapter IV.

Phrases and sentences related to the codes were written on individual index cards, and each card coded with the interviewee participant number, like P7. The coded cards were grouped according to codes and themes. The cards were examined to find relative importance, relationships, or connections among or between the codes as the cards were assembled. A list with key findings was then developed through examination and comparison of similarities and differences. A narrative was used to summarize, clarify, and attempt to explain findings, providing a more in-depth, rich description of the interview responses.

Data Analysis of Part Two: Survey

The survey consisted of two sections. The first section focused on the Concerns-Based Adoption Model (CBAM) Stages of Concern Questionnaire. The second section focused on specific UDL construct areas: General Understanding of UDL, Application of UDL, Professional Development, Impact of UDL, Support for UDL, and Personal Reflections of UDL. For both sections of the survey, the initial counts, frequencies, and descriptions of responses were analyzed for patterns and trends and described in more detail in Chapter IV.

For section one, the Stages of Concern Questionnaire (SoCQ) Quick Scoring Device (George et al., 2006) was used to convert raw scores into counts/frequencies, percentiles, and relative intensities of each stage of concern. Individual teacher Stages of Concern profiles were created and analyzed for commonalities and patterns. The profiles of groups of participants were then examined. The groups were first sorted and the teacher profiles examined by primary role and then by year of implementation experience as indicated by each participant on the SoCQ.

Section two of the survey was analyzed for frequencies and examined for relationships and differences. Descriptive statistics were first used to summarize the UDL survey data by question for each construct, then statistical analyses of each construct was completed using the responses from teachers only and grouped by their year of UDL implementation experience. The SPSS version 18.0 software was used to examine the UDL survey. The one-way analysis of variance (ANOVA) parametric test was completed to compare responses for significant differences between groups of teachers on each of

the UDL construct areas of the survey. Since the focus of the study is on teacher perceptions, the statistical analyses were applied to the grouping of teachers only, as it was appropriate to isolate the key findings based upon teacher responses. Once the areas of significance were identified, the Tukey post hoc test was used to determine where the statistically significant differences occurred (i.e., between which groups of participants). The data were then analyzed for correlations using the Pearson test of correlation. The survey analyses were summarized and then further examined alongside the results of the observations and interviews, and the data from the interviewees (teachers) who self-identified themselves as a survey participant were then reported.

CHAPTER IV

RESULTS

The purpose of this study was to present the perspectives of educators who are implementing what has been thought to be a paradigm-shifting theoretical construct to teacher practices and curriculum development, universal design for learning. Specifically, this study examined teacher perceptions of universal design for learning (UDL) during the implementation process. This study also examined the systemic changes necessary to implement change, and the concerns teachers and administrators have while implementing UDL. This chapter presents the results and general conclusions of the study. Chapter V will discuss implications from the results, present limitations of the study, and make recommendations for future study.

The study was comprised of two parts. Part One consisted of classroom observations and interviews with teachers and administrators, and provided a direct representation of individual perceptions. The UDL observation checklist determined the operative level of UDL in the observed classrooms. Interviews with teachers and administrators helped establish an in-depth look at teacher perceptions and concerns related to UDL implementation, and the components necessary for systemic change. UDL observation checklist data were analyzed for comparative information with the participant interviews. Interview responses were coded and analyzed for themes and patterns of responses. General conclusions were drawn from analysis of Part One data.

An online two-section survey comprised Part Two of the study. The first section of the survey focused on concerns, using the Stages of Concern Questionnaire (SoCQ) component of the Concerns-Based Adoption Model (CBAM). Section two of the survey focused on the General Understanding of UDL, Application of UDL, UDL Professional Development, Support for UDL, Impact of UDL, Planning for Individual Students, and Personal Reflections of UDL. The CBAM SoCQ analysis protocol (George et al., 2006) and the SPSS, version 18.0, software application were used to examine survey data.

Descriptive statistics were used to summarize the UDL survey data. The one-way analysis of variance (ANOVA) was conducted to compare responses of UDL survey constructs for differences between groups of teachers implementing UDL. For tests statistically significant at $p < .05$, Tukey HSD post hoc analysis was completed to determine where the groups differed. The data were also analyzed for correlations using the Pearson test of correlation. The survey analysis was summarized and then further examined alongside the results of the observations and interviews.

Part One: Classroom Observations and Interviews Results

Of the 30 classroom teachers and three administrators anticipated, eight teachers responded to the initial invitation to participate. The invitation was sent a second time, one week later, in anticipation of gaining more participants. Two additional volunteers responded, totaling nine teachers and one building level administrator. A district level administrator later volunteered to be interviewed. All nine teachers agreed to the classroom observations and all signed consent forms prior to the first observation. All but one teacher also agreed to be interviewed. Of the nine teachers participating in Part One,

three were in buildings that were new to implementing UDL, three participants were in buildings that were in the 2nd – 4th year of UDL implementation, and three participants were in buildings that had been implementing UDL for five or more years. The anticipated target N for teacher observations and interviews was set at 30 and administrator interview anticipated target was set at three. The actual numbers of participants and response rates were as follows: classroom observations, $n = 9$; teacher interviews, $n = 8$, with response rate of 30%, and 27%, respectively, and building level administrator interviews, $n = 1$, (response rate = 33%) with a supplemental interview with a district administrator. The anticipated number of participants for Part One was 33. Total actual number of participants for Part One of the study was $N = 11$, with a response rate of 33%.

Classroom Observations

Classroom observations were the first half of Part One of the study. During the observations, the UDL observation checklist was used to establish the operative level of UDL in the classroom and verified the implementation of UDL. The UDL observation checklist was comprised of UDL specific components and was a modified version of the CAST Educator Checklist/UDL Guidelines v.1.0. The modified version had a section added to the CAST Educator Checklist/UDL Guidelines. The added section can be seen in Appendix A. Reliability percentages are shown in Table 1.

Two classroom observations per teacher were completed for all but two participants. One of these participants stated that there was no time for two observations and the second participant needed to reschedule, but the available times conflicted with

previously scheduled observations with other teachers. UDL observation checklist raw scores and operative levels are summarized in Table 1. (Note: the reader should be reminded that the operative levels are considered on a sliding bar rather than distinct or separate levels of attainment, in that an average score of 2.3 or 2.6 could both be interpreted as an Intermediate to Advanced level.) Four of nine teachers demonstrated an Intermediate to Advanced UDL operative level for both observations. One teacher demonstrated an Intermediate to Advanced operative level during one observation and Emerging to Intermediate level for the second observation. Three teachers demonstrated a Not Yet Evident to Emerging level of UDL and one teacher demonstrated an Intermediate to Advanced level of UDL implementation during the first observation and a level Not Yet Evident to Emerging during the second observation. Each teacher interview took place after the classroom observation(s). The time and day of the interview depended upon each teacher's schedule.

Preliminary comparative findings of operative levels, teaching experience, and UDL professional development training (PD) are summarized in Table 2. Comparisons revealed that overall, the operative levels for year-1 and year-2 implementers ranged from Emerging to Advanced, with seven of eight observations in the range of Intermediate-Advanced. The UDL operative levels for teachers in the year-4 and year-5 of implementation ranged from Not Yet Evident to Advanced, with three of eight observations in the range of Intermediate-Advanced operative levels.

Table 1

UDL Observation Checklist Raw Scores and UDL Operative Levels

Participant (Observation #1 = a, Observation #2 = b)	UDL Lesson Plan Subject area	Category and (Operative level): Multiple Representation ^a	Category and (Operative level): Multiple Expression	Category and (Operative level): Multiple Engagement	Category and (Operative level): Clearly Articulated Goals and Objectives	Category and (Operative level): Flexible Instructional Methods	Category and (Operative level): Flexible Instructional Materials	Category and (Operative level): Curriculum-Based Assessments & Progress Monitoring	Sum Score and (Operative level Average) ^d	Operative level demonstrated during each observation	Reliability ^e
2a	Health-whole grp work	10 (3)	9 (3)	7 (2)	5 (2)	6 (3)	7 (3)	4 (2)	48 (2.6)	Intermediate-Advanced	100%
2b	Centers-small group work – same group	9 (2)	9 (3)	8 (3)	5 (2)	6 (3)	7 (3)	4 (2)	48 (2.6)	Intermediate-Advanced	
3a	Science-whole & small grp 1	12 (3)	10 (3)	10 (3)	7 (3)	7 (3)	7 (3)	5 (3)	58 (2.9)	Intermediate-Advanced	98%
3b	Science-whole & small grp 2–same lesson	12 (3)	10 (3)	10 (3)	5 (2)	7 (3)	8 (3)	5 (3)	57 (2.9)	Intermediate-Advanced	
4a	English-whole grp	11 (3)	10 (3)	10 (3)	8 (3)	5 (3)	7 (3)	5 (3)	56 (2.9)	Intermediate-Advanced	80%
4b	Social Studies-indiv.wk- same group	8 (2)	9 (3)	8 (3)	5 (2)	4 (3)	6 (2)	5 (3)	45 (2.3)	Intermediate-Advanced	
5a	Science-whole & small grp	7 (2)	1 (0)	2	5 (2)	1 (0)	2 (0)	4 (2)	22 (0.9)	Not Yet Evident-Emerging	na
5b	no second observation	na	na	na	na	na	na	na	na	na	
6a	PE-whole grp 1	12 (3)	7 (2)	9 (3)	7 (3)	5 (2)	4 (1)	5 (3)	49 (2.4)	Intermediate-Advanced	100%
6b	PE-whole grp 2-same lesson	12 (3)	7 (2)	9 (3)	7 (3)	5 (2)	4 (1)	5 (3)	49 (2.4)	Intermediate-Advanced	
7a	English-whole grp1	10 (3)	10 (3)	10 (3)	6 (2)	7 (3)	8 (3)	5 (3)	56 (2.9)	Intermediate-Advanced	18%
7b	English-independent wk - grp 2	1 (0)	3 (1)	3 (1)	0 (0)	1 (0)	2 (2)	0 (0)	10 (0.3)	Not Yet Evident-Emerging	
8a	English-whole grp 1	8 (2)	3 (1)	4 (1)	3 (1)	2 (0)	3 (1)	2 (1)	25 (1.0)	Emerging	100%
8b	English-whole grp 2– diff. lesson	8 (2)	4 (1)	6 (2)	2 (0)	3 (1)	1 (0)	1 (0)	25 (0.9)	Not Yet Evident-Emerging	
10a	Math-whole grp	7 (2)	3 (1)	4 (1)	3 (1)	3 (1)	5 (2)	5 (3)	30 (1.6)	Emerging - Intermediate	64%
10b	Current Events-individual wk-same group	9 (2)	9 (3)	8 (3)	6 (2)	5 (2)	5 (2)	5 (3)	47 (2.4)	Intermediate-Advanced	
11a	Social Studies-whole group	7 (2)	1 (0)	2 (0)	1 (0)	4 (1)	2 (0)	1 (0)	18 (0.4)	Not Yet Evident-Emerging	na
11b	no second observation	na	na	na	na	na	na	na	na	na	

^a Each checklist category had a different number of components (points) per category. Based upon number of components, the total point values per category were divided into quartiles, which created four operative levels of UDL. ^b Operative levels were defined as: 3 = Advanced, 2 = Intermediate, 1 = Emerging, 0 = Not Yet Evident. ^c Sum scores of the categories (out of 60). ^d Average of the operative levels for all categories - values indicate mean average to tenths to show proximity to operative level cut-points. ^e Reliability formula: small sum score/large sum score x 100.

Table 2

Operative Level by Building UDL Implementation Year

Participant #	Building Year of UDL Implementation	Years of UDL Training	Years of Teaching Experience	Observation #1 UDL Operative Level ^a	Observation #2 UDL Operative Level ^a
2	1	2	2	2.6	2.6
4	1	0	1	2.9	2.3
10	1	1	1	1.6	2.4
3	2	2	4	2.9	2.9
5	4	3	5	0.9	na
7	4	4	5	2.9	0.3
6	5 ⁺	4	15 ⁺	2.4	2.4
8	5 ⁺	5	5 ⁺	1.0	0.9
11	5 ⁺	2	7	0.4	na

^aOperative level cut points are defined as: 3 = Advanced, 2 = Intermediate, 1 = Emerging, 0 = Not Yet Evident.

General conclusions of the classroom observations were based upon an examination of the data by year of implementation and those observations that were Intermediate to Advanced operative levels (Table 2). Five out of six observations were in an Intermediate to Advanced operative level for those participants in the first year of UDL implementation. Three out of five observations were in the Intermediate to Advanced operative level for the teachers implementing UDL for two to four years. Two out of five observations were in the Intermediate to Advanced operative level for teachers with five or more years of UDL implementation experiences.

Interview Coding

Of the nine teachers observed, eight participated in the interview portion of Part One. For those teachers who scheduled a face-to-face interview, they were given a copy of the UDL observation checklist following the interview. For those who requested a telephone interview at a later date or who did not wish to be interviewed, the checklists

were given to them following their classroom observation(s). Each teacher interview was to begin as a one-legged interview, with an opening question such as, “How are things going for you?” and subsequent questions would expand upon participant’s response to the first question, guided toward the research questions. However, upon using the one-legged interview technique with the first participant, the participant was confused, not knowing what to say and did not answer the question. In order to facilitate a more UDL specific response, the interview format shifted to open-ended questions reflecting the secondary research questions. Each interview, however, closed with the question, “Overall, how have things been going for you?” so that the interview would still include the initial one-legged question. The duration of each teacher interview ranged from seven minutes to nineteen minutes, depending upon the extent to which the interviewee replied to each question.

The administrator interviews were completed the same week as the teacher interviews and during a scheduled time chosen by the administrators. The research question that guided the administrator interview was, “What systemic changes need to take place in order to implement UDL principles?” The administrators were also asked what their expectations for teachers were regarding UDL implementation. The length for the administrator interviews were 10-20 minutes.

After the interview audio files were transcribed, the interviews were coded. First, attributes were listed that were thought to influence teacher perceptions of an innovation. The attribute list was based upon researcher experience and information drawn from literature and served as a starting point for examining the transcripts. A visual

representation of these attributes and how they might be grouped into categories and their relationships to teacher perception is shown in Figure 1. The first transcript was examined through this lens.

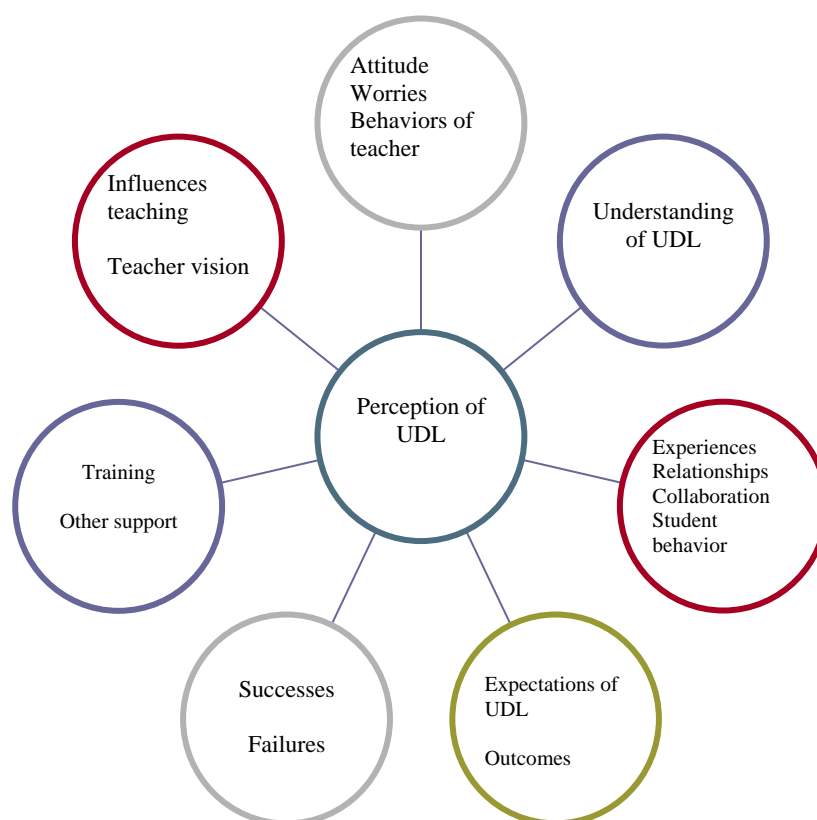


Figure 1. Initial diagramming of attributes that influence perception of UDL

Data from the first transcript then informed the definitions and codes and a codebook was created for the teacher interviews. These codes were used to analyze subsequent teacher transcripts. During the examination of the transcripts, the researcher noticed that the interviews revealed rich descriptions and examples of themes. (The codebook of codes and themes from the teacher interviews are represented in Table 3 under *Teacher Perceptions*.) Index cards were used to record coded data. Phrases or

sentences, the identifying codes and themes, and the corresponding participant number were written on the index cards. Each card was labeled with the interviewee participant number (e.g., P7), in the bottom right corner of the index card so that if the quote was used in the descriptive interpretation of the interviews, the participant number could be quickly located.

Following the examination and coding of the teacher interviews, the administrator interviews were then coded and analyzed using codes and themes of systemic change that emerged as the administrator transcripts were examined. The research questions guided the administrator interviews and addressed what systemic changes take place during the implementation of UDL, in addition to the concerns administrators might have during the implementation, and what administrators expect of teachers during the implementation. The administrator interview coding of responses followed the same format as the teacher interviews. The administrator interviews were analyzed only from the systemic change codebook because the focus of the study was on teacher perceptions UDL, not administrator perceptions. The administrator interviews were analyzed for themes or patterns of systemic change. After pondering the relationships between the codes of both teacher perception and systemic change, it became clear that the two could not be listed as separate codebooks. Many of the codes of one affected the outcome of the other. Teacher transcripts were then re-examined through the lens of systemic change codes.

Table 3

Interview Codebook and Definitions

Teacher Perceptions	
Code	Definition
AT-EM	Teacher attitude or emotional state
BEH-S	Student behaviors
BEH-T	Teacher behaviors
DEF	Teacher interpretation or definition of how to use UDL
EXPEC	Teacher expectations of the UDL process, etc
EXPER	Teaching experience
FAIL	Any failures despite use of UDL
FEAR	Teacher's fear...takes worry to the next level
GRAT	Teacher gratification
INF-TL	UDL has influenced some part of the teaching and learning process
INTU	UDL integration becomes intuitive, done without thinking
OBST	Any obstacle that might impede success of UDL
PRE-CON	Preconceived notion or idea of what UDL should be
PRES_INFO	The presentation of UDL information or the UDL trainings
RELA	Relationships in the education setting
SUCC	Any successes/academic improvements directly credited to use of UDL
TIME	Time to learn or use UDL
VISN	Teacher's vision or beliefs
WORY	Teacher's worries
Systemic Change	
Code	Definition
ACCT	Accountability to supervisor, school board, or State
AT-CH	Attitude toward change
BLD-CAP	Build capacity
BY-IN	There is 'buy-in' for implementing UDL
C-BEN	See the benefits or success
COM-LANG	Teachers share a common language centered around UDL
COMP-PLC	UDL components are in place
CON-BEL	UDL contradicts teacher's beliefs
DIFF	There is a noticeable difference or significant difference in teaching strategies
EXPEC-CH	The expectations during change
MAND	Mandatory use of UDL
NEED	An identified need for change
OBST	Obstacles or impediments
ORGNZ	Organized or runs 'smoothly'
PRES-INFO	The presentation of UDL or the UDL trainings
SUPP	Maintain support for UDL
TCHR-EVAL	UDL is included as part of teacher evaluations
TIME	Time to adjust to UDL or to learn UDL
WORY	Teacher's worries

Common themes emerged during the analysis of the interview responses. Since some of the codes from the administrator interviews overlapped with the codes from the teacher interviews, rather than create a separate codebook, another section in the initial codebook was created to reflect the codes of the administrator interviews and are represented in Table 3 under *Systemic Change*. Table 3 shows the final codebook of both teacher and administrator interview codes.

A few codes were listed in both code lists, such as time (for professional development or for planning UDL), teacher attitude, worry or concern, expectations, and training or professional development. These overlapping codes were color-coded on the index cards to identify the code list designation. The process of sorting all the coded data then began.

All index cards were sorted by codes and themes. Interrelationships between and among codes and themes emerged from the data that challenged the linear nature of original attribute diagram depicted in Figure 1. For example, *collaboration*, could be related to the *interrelationships* amongst teachers while at the same time, *sharing a common language* could lead to *collaboration*, which could influence the *action* the teacher takes regarding the implementation of UDL. Additionally, while the code *attitude* may influence teacher perceptions of UDL implementation, this same code may also influence systemic change but the connotations differ. Through the lens of teacher perceptions, *attitude* is the personality and emotional factors of the teacher that influence decisions and actions, but looking through a lens of systemic change, *attitude* is a teacher's feelings toward change itself. There was a need to recreate a visual

representation of the interrelationships among the codes and themes, as seen in Figure 2. Throughout Figure 2, there are interconnected codes and themes, while the arrow direction illustrates how the codes (ovals, squares, rounded squares) funnel into a theme (hexagons) and how a new code could surface from a theme, both which might influence perception. In Figure 2, there are a number of codes that have bi-directional arrows. This indicates that the particular code or theme not only influences another code or theme, but also can be influenced by a code or theme. For example, while *attitude* can influence the *worries* a teacher has for UDL, the *worries* themselves can affect *attitude*. Once the code and theme interrelationships had been established, each teacher and administrator interview was analyzed again, looking for additional common themes and any additional index cards were sorted with the others

The frequencies of the codes and themes were recorded in order to identify any relationships and incidence within the interview responses, which helped to analyze the interviews more in-depth and show the interrelationship between the teacher perceptions codes and themes and the systemic change codes and themes.

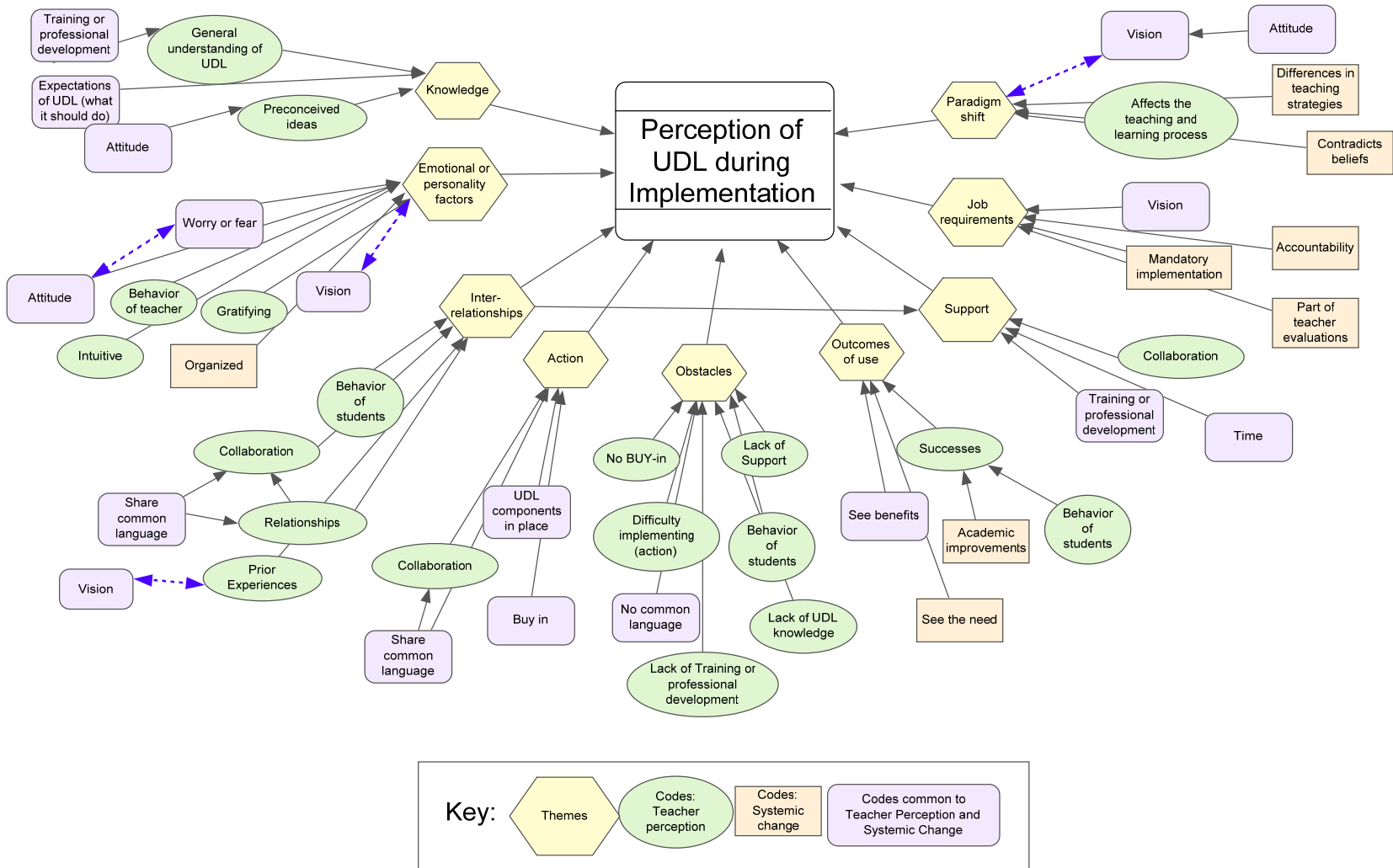


Figure 2. Visual diagram of codes and themes

Teacher Interviews: Analysis and Interpretation

Several preliminary findings emerged from the teacher interviews. This section includes a general summary regarding the interview analyses through the codes and themes shown in Figure 2. A re-examination of the interviews with the observation data follows the analysis of the administrator interviews.

Codes and themes are *italicized* in the summaries so that the reader might easily connect them with Figure 2 or the codebook in Table 3. Consideration of years of teaching experience and UDL experience were explored throughout the interpretation. All participants are referred to in feminine. Chapter V will present conclusions based upon the results of this analysis.

Knowledge of UDL

All interview participants stated they had either a preconceived idea of UDL or had learned knowledge of basics of UDL through district professional development (PD). Knowledge of UDL includes the codes of (1) having a basic *understanding of UDL* which might be influenced by *UDL training or professional development*, (2) a teacher's *pre-conceived ideas of UDL*, which might be affected by *attitude*, and (3) *expectations of what UDL is supposed to do*.

All teachers interviewed had *knowledge of UDL* and had some *UDL training*, but the extent of these varied from teacher to teacher. P10, with one year teaching experience and as a first year implementer, summed the effects of *UDL trainings* with this statement, "Universal design for learning is a very straight-forward approach. It's not a lot of complicated things to learn. Once you understand it, then it's easy to implement..." (line

85-87). Sometimes, a teacher's *preconceived ideas* influenced their general understanding of UDL, as described by P10 (lines 71-73), "I knew what universal design for learning was because I had studied and had read about it." *Attitude* and *expectations* sometimes go hand-in-hand as influencing an individual's general understanding of UDL. P4, with one year teaching experience and as a first year implementer, described how *attitude* and *expectations of UDL* might go hand-in-hand as she described how she saw the traditional teaching method as having a strong-hold over teaching and learning, with the teacher and class not being able to vary from the 'one-way' of teaching and how UDL allowed more freedom in teaching:

I think UDL is extremely important for teachers who are more traditional teachers-that all they do are worksheets. That doesn't meet the needs of the kids. They might be able to fill out those worksheets but they're not learning...It just seems like teachers have more of a stronghold on their class than what they should and with UDL, I think that helps. It gives teachers permission not to do that... (lines 162-165, 172-178)

P8, with more than five years experience in both teaching and UDL implementation, described how her past experiences (*pre-conceived ideas*) influenced her *expectations of UDL* and her *attitude* toward UDL:

I think UDL implementation started years and years ago, probably under a different name...I am always going to come up with different ways for them to learn, meaning, OK, if you're not very good at vocabulary, in the book, exercises in the book, then let's come up with sentences that they

can write. Let's come up with drawing pictures and they can write in the vocabulary book. You want to reach out to every student in something that they can do pretty well... You're trying to reach out to all sorts of different modes of learning. You do group work or you do--you draw the scene... Drawing the scene and writing about the scene are great, they're both wonderful. They're both equally important and I'm trying to come up with different means to reach them. (lines 12-13, 63-67, 68-72)

Emotional or Personality Factors

Prevalent throughout all teacher interviews were *emotional or personality factors*: teacher *attitude* and *behaviors*, *academic vision*, and *worries* (whether viewed as an obstacle to implementing UDL or a personal worry). Other codes described by participants and were prevalent in most teacher interviews included teacher feeling of *gratification*, how *organized* a teacher might be, and how UDL might become *intuitive* through repetition.

The codes of *personality*, *attitude* and *organization* were seen throughout the interviews and accompanied by statements regarding their *vision*. For example, P7's *vision* was so influenced by UDL, that UDL influenced other areas in her life, as seen in this description of preparing for Christmas dinner:

When I plan Christmas dinner, I'm thinking of it like UDL. Ok, I need something for the kids to do over here, while the adults are doing this. And then there's those people that want to watch the football game, so we got to have a place for that to happen and then we want to do this and the big

goal is we all want to be together as a family, so how are we going to make all those people happy at the same time and still achieve our goal? So, I mean, I've got it integrated into my mind to that level that it pervades everything. (lines 134-140)

P7 has five years teaching experience and four years implementing UDL. There were also a few interviewees who did not feel as excited with the implementation of UDL, as indicated here with the *worries* of P8, “You’re trying to constantly come up with different ways to reach, and different ideas, and different activities. You did that ten years ago. It’s the same thing under a different name” (lines 134-140).

Many of those interviewed also stated that they felt good (*gratification*) about the teaching and learning process in their classroom while implementing UDL, as represented by these comments: “I feel really positive...I feel encouraged...I feel real good about what’s going on right now in my classroom...” (P7, lines 152, 155-156, 162-163). Participant P2, with two years teaching experience and as a first year UDL implementer, summed up the *gratification* most of those interviewed felt with these statements, “I think good things when I think UDL...” and “We’re thinking about UDL even when we don’t call it UDL...” and “We’re actually reaching all those different types of learners through the different methods, it’s just, it’s a great feeling as a teacher...” (lines 145, 147-148, 135-136).

Several of those interviewed reported that after repeated use of UDL principles, their behavior changed and the process became almost *intuitive*, as described by P10 (lines 84-85, 81-83), “I feel like I’ve been pushing myself to use it [UDL] as often as

possible, and now it's second nature to think in those ways ...after you start using it [UDL] for a while it just becomes the way it's done. You automatically think in that way when you're designing projects or lessons for the class. It [UDL] becomes intuitive once you've been doing it..."

Inter-relationships

As shown in Figure 2, there were codes within the theme of *interrelationships* that affect multiple areas of teacher perception. The code of *sharing a common language* was linked to *action* while at the same time *common language* also influenced *collaboration* and *relationships* within teacher perception. Teacher *experiences* and *behavior of students* also influenced teacher perception.

Teacher interview results showed nearly all participants stated that they felt collegial *relationships* regarding UDL were important, whether the relationships existed in their building or not. A first year implementer with three years of teaching experience felt that "teaching partners keep[ing] each other accountable" (P2, lines 114-115). P8, with more than five years teaching and UDL implementation experience, also felt relationships were important, but were lacking in her building, "You have to have a connection within your school to really work on, everybody really has the same goals, UDL, literacy, whatever, we don't talk about it enough" and "not everybody is backing it [UDL] up and so you're fighting your own teachers" (lines 159-161, 133-134).

Sharing the *common language* of UDL through *collaboration* or planning was revealed in some interviews, as exemplified by two participants. First, as P8 described UDL collaboration in her building, "As a whole building, the English department,

Science, and Special Ed teachers are reading a book together. We're talking about how it [UDL] implements and works, maybe, in our classroom" (P8, lines 16-20). Secondly, as P7 described a time before the staff in her building had a *common UDL language*, they would react curiously towards her instructional techniques, until they *understood UDL* and *shared the common language* of UDL:

So I might have great idea for a [pause] unit or a lesson or something.

Then here I go and then people look at me like I'm crazy, but now in the last three years people don't say 'Oh, you're just doing something crazy' they say 'Oh, that's UDL.' (P7, lines 51-54).

Student behavior influences inter-relationships. P10 described how much more successful the learning environment was when students were actively involved, participating in the lessons, "They've [students] got their heart into it. It's a much more successful learning environment because they [students] feel like active learners" (lines 37-38). For P3, UDL has helped create positive interactions with students because, "I have very few discipline problems as a result because my kids are engaged" (lines 41-42). For P2, she connects with the students during the reflection time, at the end of a project,

At the end of a project when you take the reflection time and talk about challenges and successes and hear an eight or nine-year-old say, 'Well, this went well, but we learned from this part, and even though we planned this, this changed and it came out this way'. So just to hear them go through that process as a child, it's been phenomenal, (lines 136-139).

A teacher's *experiences* can influence *inter-relationships* and the *vision* they have for teaching and learning. P6 described how the changes in class sizes over the years has limited the relationships she has with students, "The more kids we have in class, the more varied the skill level and if we have to have people go help them [students], then they're [students] not getting they're supposed to get from us from class" (lines 59, 63-64). P4 reflected on her past teaching experiences and how she made changes in her *vision* for teaching to help the students, "I used to talk more, I mean, like give more answers, like 'feed them' more...I had to learn how to step back...It's letting them struggle just a bit to get their own answers" (lines 68, 76-77, 73-74). P2 summed up the importance of experience and relationships with other teachers, "I think a lot has to do with experience...and teaching partners keeping each other accountable" (lines 114-115).

Action

The codes in Figure 2 that are linked to *action* include *share common language*, *collaboration*, *buy-in* and *UDL components in place*. These codes were revealed in nearly all teacher interviews. *Sharing a common language* was seen more throughout the interviews of those teachers with three or more years UDL experience and four or more years teaching experience.

Nearly all participants also felt the *UDL components* or principles were in place within their classroom. Even if they did not specifically use the UDL terminology to describe what they were doing, their lessons and their conversation illustrated the principles of UDL. "We actually have time to sit down and really look at the UDL concepts, and spend more time applying them [UDL] and really making sure they [UDL

concepts] are embedded” (P2, lines 97-98). One participant described how the *collaborated* lessons included UDL by “making sure that when we prepare...the lesson planning...that we are hitting at least one [UDL component] really hard” (P4, lines 103-105). Other participants described how they integrated the UDL principle of multiple expression opportunities with: “We’re trying to give students choices in how they respond to homework...” (P6, lines 49-50), and multiple engagement opportunities through reflection of a planned lesson with “Can we support the different means of engagement and reaching out to students with technology?” (P8, lines 40-41).

A few participants showed through their responses that they had *bought into* the idea of using UDL. P2 described *buy-in* with the following statement, “I think that’s one of the reasons we have the universal design for learning, so we know there are different means to hit each of those levels for the kids. So I think it’s more of a tool that we use in the process of our planning” (lines 40-42). Participant P3, with four years teaching experience and as a first year implementer, stated the importance of buying into UDL, but had a concern that teachers were buying into the UDL ‘component idea’, rather than focusing on instruction through UDL, “I think my biggest concern is making it about UDL, rather than focusing on what is truly important which is obviously instruction” (lines 10-12).

Obstacles

A majority of those interviewed experienced *obstacles* while implementing UDL. Most obstacles were teacher-specific. For example, P11 had difficulty with the general understanding UDL (*knowledge of UDL*), exemplified by this statement: “At the

beginning it [UDL] was somewhat of a fuzzy thing for me because I didn't quite have my finger on what it [UDL] was, but now it's become a lot clearer..." (lines 130-131). P7 also described a major *obstacle* for some teachers which eventually evolved into *sharing a common language* of UDL:

The first obstacle was just getting the vocabulary down because when they start throwing stuff at you, you're like 'here's the next program or here's the next thing coming down the way' I think your first inclination is you sort of funnel out when it's too much information so you can sort of get a grasp of it...at first, I mean, nobody knew what anybody was talking about and now we have this common vocabulary that we can use to look at instruction and assess the effectiveness (lines 45-48, 60-62).

Others had concerns about maintaining the students' interest (*student behavior*) in the lesson, "Trying to make sure that I'm not hindering a student...making sure that I am meeting the needs of all my students..." (P4, lines 142-143), while another participant thought student motivation was key to UDL success when she described the main *obstacle* she encountered, "Obstacles? It's always [student] motivation" (P11, line 78). Participant P10 felt it was difficult to implement UDL if she did not know the students and their learning needs,

Starting off the year, it was difficult because you really need to get to know your students first before you can fully implement and give them opportunities to try different things, and explain what they've learned in different ways, or learn in different styles. (lines 14-16)

P2 felt the whole idea of integrating UDL (*action*) was a challenge as she described,

Staying focused on being student-centered, so we know we are teaching the standards that we need in way that's interesting for them and still incorporating all these different [UDL] methods. That's been a huge obstacle - to do it all at once. (lines 124-126)

For participant P8, the difficulty in the integration of and access to technology to *support* the UDL principles, and the lack of ongoing UDL training were ongoing *obstacles* as described here:

The biggest concern has to be technology ...the technology super-lags behind in our [name of] school compared to these kids from elementary to middle school. They might be on a computer all day, during the day, and easy-access to a computer lab. We fight for computer lab time. So, they come here and it's sort of at a standstill. So, that's the number one block, is technology and access to technology...And then the training, is at this time, at minimal...We haven't been meeting very much. (lines 40, 55-59, 27, 17-18)

Outcome of Use

Seeing the need for UDL, seeing the *academic improvements*, seeing the *benefits*, and the *successes* were codes that funneled into the theme *outcome of use* in Figure 2.

Successes were also influenced by the *behavior of students*.

A majority of those interviewed experienced *successes* in their classroom using UDL, and *saw the benefits* of UDL, primarily in the *behavior of students*, but also in

academic improvements as seen in these participant statements: “I have very few discipline problems as a result because my kids are engaged” (P3, lines 41-42). “Our kids don’t complain about homework near as much as they used to...because we’re giving them choice in how they spit the information back out to us, they don’t quibble as much as they used to” (P6, lines 85-88). “They’ve [students] got their heart into it and I think it’s a much more successful learning environment because they feel like they are active learners” (P10, lines 37-38). “To see the kids who struggle in different areas, or maybe last year the same hated school, [now] jumping up and down and smiling...” (P2, lines 133-134). “My successes have been assessment scores...overall, in general, there’s a trend that they steadily move up, and technology has played a huge role in that...” (P3, lines 50, 51-52).

It was noteworthy to point out that the codes, *seeing the benefit* of UDL and experiencing *successes* were revealed more frequently in responses of teachers with the one to three years of UDL implementation experience than in the responses of those teachers with more than five years UDL implementation and teaching experience.

Support for UDL

Based upon these teacher interviews, *Support* for UDL primarily consisted of *time* to plan with UDL and was affected by *interrelationships*, as seen in Figure 2. Most teachers interviewed felt that *support* for implementing UDL was important, whether they felt it existed in their building or not, as seen in the following examples. “I was working with a technology teacher from [name of community college] and she gave me some hints about how to help with UDL...” (P4, lines 96-98). “We get a lot of support.

Our administration supports us...we get a lot of support from our administration and also from other teachers in our area...that's probably the best thing, the support" (P6, lines 92, 93-94, 97).

One building uses a rubric to support teachers as they reflect on how they had been implementing UDL, but teachers did not often see the results of the building's rubric scores. P7 felt that knowing the outcomes of the rubric survey (*support* for the building) would help her as well, "We had to rate ourselves on that [rubric] scale last year and then we did it again this year...[but] I don't think that data is being used as well as it probably could be, because I haven't seen it and I would like to know how that's going..." (P7, lines 227, 228-229). P3 felt the level of administrative support needed strengthening, "I do see that [focus on UDL rather than instruction] being a problem from an administrative level down when they are trying to get people to implement it [UDL]" (lines 22-23). Participant P8 explained the variances of *support* and the lack of equitable UDL *training* in her building with this statement:

I think the younger teachers...probably adhere to it [UDL] more because they have special teacher meetings...but the rest of us aren't really pushed to the UDL stuff...Years ago we had, at least once a year, we had this type of UDL in-service. With budget cuts, we don't have that anymore... we try to do it maybe within our department and we failed miserably in our department...the workshops aren't quite there anymore.... The technology's not there, the budget's not there, the push to update your curriculum is not there, from our own school leaders. It's not there... I

don't mean to complain, but it's just that it's a fact. It's just the way it is.

(lines 34, 34-35, 36, 15-17, 159, 117-118, 111-112)

Job Requirements

Further examination of the interview responses of the participants revealed that some teachers were aware that UDL was *part of the teacher evaluation* process, "The administration came around and did their tally marks..." (P7, line 235). "The accountability piece saying, 'We need to do this and let's make sure we hit this...'" (P2, line 112). "Making sure... that UDL is implemented throughout" (P4, line 94).

While some participants were aware that UDL was expected to be implemented in their classroom, or *mandatory implementation*, some felt that not everyone was actually implementing UDL, as seen by these two very different responses regarding teacher perceptions of expectations. "I think this building seems like it's pretty dialed-in ... I think that the classrooms are on board...it's [UDL] now just a part of our culture" (P7, lines 93, 114, 56). While, "I think ours [department] is one of the least really adhering to UDL..." (P8, lines 33-34), and "I don't think the teachers are connected to the yoke, the whole UDL concept" (P8, lines 157-158).

A few teachers mentioned that they were held *accountable* for implementing UDL, but many were aware that UDL was simply a focus for instruction within the district *vision*. The district vision is discussed later through the systemic change codebook.

Paradigm Shift

In Figure 2, the theme, *paradigm shift*, included the codes, *differences in teaching strategies, contradicts beliefs, affects teaching and learning*, and *vision*. A teacher's *attitude* also affected *vision*. The codes of *vision* and *affecting teaching and learning* were prevalent throughout all teacher interviews.

Most teachers felt that UDL *affected the teaching and learning process* to some degree. "I honestly think it [UDL] makes it [planning] easier because I feel like I have so many more options for presentation and for engagement" (P3, lines 29-30). "UDL has made all that [planning] so much easier...It's [UDL] taught me that I don't have to be the one presenting the information" (P7, lines 23, 32-33). Several teachers also expected a change in the teaching and learning process as summed up with what P2 (line 74) stated, "Their [student] outcome is going to look different along with their process on how they got there."

All teachers also felt their academic *vision* was affected by UDL. P8 described how her vision shifted, that UDL had initially *contradicted* her *beliefs*, "In the past I just had them do from their book, what they have in front of them. Now, I'm trying to pull out different forms of knowledge that they can use" (lines 101-103). For another participant, implementing UDL was initially a challenge, because it *contradicted* what she *believed* would be successful, but the use of technology helped change her *vision*:

We [teachers] don't want to give up our activity time...We didn't want to sacrifice the kids' participation time...We look at it [UDL] and we look at technology and...what we did was supplement our lessons on the

computer so that the kids who are absent or kids who...don't get it, we have an outlet on our website where they can actually go and get the lesson. And that was directly influenced by the UDL design because now they [students] had flexibility in how they were getting the information from us [teachers]. (P6, lines 12, 13, 18, 19-23)

For others like P7, whose personality and *attitude* was reflected in her description of how her *vision* was already in-line with UDL, as exemplified by this statement, "I realized that this is how I already am, this is how I think, this is no big deal...I'm not going to say it's [UDL] changed the way I've taught...to me UDL...is the workplace" (P7, lines 48-49, 168, 170).

Code Lens of Systemic Change

When examining teacher interviews through the codebook for systemic change, a few codes were common to all. Through this lens, teacher *attitude* is defined as personal impressions of change itself. Participant P7 gave a perception of how she views the change towards UDL. "I just think the more people open their minds to that [UDL philosophy]... they just look at this [UDL] as the-flavor-of-the-month and they don't even realize it" (P7, lines 181, 182-183). P8 has had experiences with other innovations in the district. She explained her position regarding the district change toward UDL, and how it did not affect her *vision*

It changes its name...I think UDL to me is constantly evaluating better strategies, more strategies, different strategies to meet different needs of the students. And so you try one time of taking notes, ok, that doesn't

work, you try something else. You're constantly re-evaluating and changing your curriculum....I think it's tough. I mean you're trying to constantly come up with different ways to reach, and different ideas, and different activities. You did that ten years ago, different activities. It's the same thing under a different name. (lines13-14, 141-145, 153-155)

Then there were some teachers, like participant P3, who accepted change more readily. "It's always kind of been my philosophy and so I made it work even with problems and situations" (P3, lines 79-80). Another participant accepted the changes through her *buying-into* the idea of UDL, "I'm sold on the processes [of UDL]...I am sold on it [UDL]" (P4, lines 53, 54). One participant saw the *benefits* of UDL after trying it out on some lessons, "When we're using UDL, we're hitting pretty much everybody's learning style, so it [UDL] can't help but to help everybody" (P6, lines 106-107).

Administrator Interviews and Systemic Change

While the administrator interviews were coded similar to the teacher interviews, the interpretation is presented differently. Three overarching categories were revealed during the interpretation of administrator interviews, all of which might affect systemic change toward implementation of UDL (a) a district *vision* for UDL; (b) an infrastructure which might include *support*, building capacity, key staff leaders like facilitators or motivators; and (c) internal factors of stakeholders. Internal factors might include an individual's philosophy or *vision*, whether they *buy-into* the idea of UDL, and their *attitude* toward change.

District Vision

Both interviewees spoke of their ideas for what UDL looked like, what UDL was doing for the district or for teachers, and how it fit into the big picture, or goal. While teachers spoke of personal *visions* or goals, the administrator interviews reflected a district-wide *vision*. The *vision* and the function of UDL within the *vision* permeated the administrator interviews. The district administrator discussed the goal/*vision* of the district for UDL implementation:

That's my framework up there in the corner [points to poster on wall].

UDL drives everything that we do... we'd like to get the point that we're not talking about pockets of excellence, but that we're talking about where we have ... Eighty percent of our teachers across the district understand UDL and I would say we have an understanding close to that, but then the actual application is where we're working on now. And if we could get to that 80% mark, I think we'd be in good shape, but we're not there yet. (P1, lines 74-75, 136-137, 137-140)

The district administrator also had expectations of teachers in order to fulfill the *vision*:

We view it [UDL] instructional so our system-wide emphasis was on really beginning to work with teachers and getting them to understand that they had to really be very reflective about their instructional practices. (P1, lines 21-23)

The building level administrator described what UDL was:

You know UDL really is a contextual piece that, from my point of view, it's a conceptual framework to work from.... It is a constructivist kind-of approach that we can create the model we want that's really tailored to us, but also informed by best practice and research. (P9, lines 136-137, 143-145)

The same administrator also described the goal for UDL at the building level, "We've been building towards having UDL become just a natural part of our day" (P9, lines 30-31). P11 described the district *vision* during her explanation of the role she has as a UDL building facilitator,

Well, I'm part of a committee, the instructional consultation team....that's really considered to be under the UDL umbrella because our role is to help the teachers and the students increase their performance in the classroom and it's to make that match at where ever they are...in their reading or math or behavior or whatever, [pause] is to make sure that you help the teacher find that match and so I'm part of that. (lines 114-115, 117-119, 119-121)

P7 also stated that she felt teachers were implementing UDL district-wide, "My perception so far is that I think that the classrooms are onboard" (line 114).

Infrastructure Influences

The infrastructure, the foundation of the UDL implementation, was seen in both administrator interviews in the areas of support, building capacity, and having key staff as facilitators or motivators to implement UDL. It should be noted that *support* was a key code within the teacher interviews as well.

Support areas include professional development or trainings, creating an environment for change, and using resources to support UDL. One administrator had concern regarding professional development, not wanting UDL to fall away as other innovations had in the past. “How do we deploy so that it [UDL] actually gets to the classroom and isn’t just another set of letters in our alphabet soup that we call education” (P9, lines 35-36). Professional development through teacher evaluation was also evident in the interview with P9:

We started focusing teacher personal professional development goals and observations where I note the UDL and give them feedback on their UDL when I’m doing observations and for those that are past the observation phase in our evaluation program, UDL was one of the three major areas they could focus on for their professional growth. (P9, lines 21-25)

All district professional development and other trainings were under the framework of UDL, which created an environment for change, as described by P1 (lines 26, 69-70) “All of our conversations really revolve around the instructional process....We have building level teams that continue to work on all of our initiatives falling under the UDL

framework.” The number of professional development days for UDL had recently changed in the district and that was a concern for P9:

Many, many, many trainings are what I call drive-by trainings, where somebody comes in. They train a bunch of people. They walk away. That’s not useful...now that [name of state] has withdrawn the in-service days that we used to actually move the entire organization forward, our supportive designs are becoming our primary designs...we’re going to miss that overview that you need, the context conversations...without those connections, it’s a pretty precarious situation for professional growth. (P9, lines 107-109, 110-112, 115-116, 118-119)

The lack of state financial backing and district cutbacks prompted P9 building level administrator to use whatever time was available throughout the school day as professional development and training.

Teams of departments...are working...both before school, after school meetings, and lunch time meetings and most of our [name of meetings] happen during lunch so you can eat your lunch and have the professional conversation and it doesn’t impact child care....we can still do our other work and still have that collegiality it takes and the inspiration it takes to keep moving. (P9, lines 65-68, 69-70)

Another area of support that was seen in the administrator interviews was the area of building capacity. Building capacity for UDL implementation might include empowering staff with skills necessary to implement UDL, building their confidence to recognize their

personal needs, and encouraging growth in UDL. P9 described the importance of connecting the pieces of *professional development* to empower staff and build confidence:

Connecting the dots for teachers with a common vocabulary has been hugely powerful. And as long as we can keep the dots [instructional practices] connected so they [teachers] don't see them [instructional practices] as fragmented pieces of the puzzle and they see how to integrate and support one another, then you get some power in that conversation and practice...that's how you get a culture moving in the same direction.
(lines 86-89, 237)

Once teachers went through the basic UDL *professional development*, there were expectations for personal growth in UDL. P1 described the district level expectations of teachers:

Our expectations are that teachers will utilize the principles of UDL in their instructional planning and delivery....Our expectation is that they [teachers] are thinking about personalizing the learning goals for that lesson and looking at multiple ways to engage kids....Our concern was that we had pockets of excellence and that it [UDL] wasn't across the board....We are still not systemic. (lines 92-93, 109-110, 61-62, 65)

Once teachers were onboard with UDL, administrators stated that the district offered *professional development* to encourage personal growth for both teachers and building leaders in using UDL in the assessment process:

We have some great teachers who really use a lot of different means of representation and engage kids in a variety of ways and feel that everyone has to take the same test at the end. So this whole year the secondary administrative group is doing a book study focused on assessment and I think our teachers are starting to understand that it's ok to allow kids to demonstrate what they've learned in different ways. (P1, lines 111-116)

Teachers, on the other hand, had a different viewpoint of the level of UDL training. "I had no UDL training, except for new teacher orientation, it was mentioned" (P2, line 11). "I went through some training and it was not just UDL, but it was [name of other training] learning and all training we had for that" (P4, lines 72-73) and "The workshops aren't quite there anymore" (P8, lines 158-159).

Another area of *infrastructure* seen in the administrator interviews was the need for key staff leaders, facilitators, or trainers of UDL to guide and *support* implementers. As described by P1, in the same statement regarding the professional development and training earlier, this quote also focused on the importance of the building level team leaders and the role they play in the UDL initiative, "That's why we have building level teams that continue to work on all of our initiatives falling under the UDL framework.... We use instructional consultation teams, which is a problem solving approach" (lines 69-70, 76-77). Participant P9 confirmed the importance of building level key staff leaders, as seen in this example: "We moved it [UDL training] away from our instructional delivery team to a specific teacher-leader group in our [name of] grant" (P9, lines 32-34). The building administrative leader also served as a leader for implementing UDL, ensuring

that teachers were including UDL in their professional goals. P11 spoke of a district-level UDL facilitator and how the trainings helped her to understand UDL:

I like when things all connect. So when ...she [facilitator] finally put it in an explanation that I understood, and as she's explaining, I'm thinking, 'That's what we're learning in our Masters class' and then, 'I'm doing that in my class.' When it all started to come together to me, I thought, 'Phew! I'm doing fine.' So I feel like I'm right on track with it [UDL]. (lines 147-152)

Internal Factors of Stakeholders

The last theme identified in the administrator interviews was the stakeholder's internal factors. Those factors included an individual's *vision* or philosophy, *buy-in*, and *attitude* toward change. *Attitude* and *buy-in* codes were also common in the teacher interviews.

One administrator stated how a teacher's philosophy might initially have been formulated through traditional methods of teaching, being taught or trained that one single way of teaching or one way to test knowledge was the only way that was fair. P1 described the challenge of re-assuring teachers that it is acceptable to allow students choices in how to demonstrate knowledge. P1 felt that allowing choices is not what teachers were taught to do in their teacher preparation programs:

As a teacher, that's not what we were taught....because 'it's not fair'[but] you've got to have multiple ways....We knew that would be a

challenge for some people and it remains to be a challenge for some. (P1, lines 116-117, 121, 50, 53-55)

Other times, working with a teacher's *attitude* toward change was also challenging:

We, probably like a lot of districts, have some teachers who kind of have the mindset of, 'this is how I do things and if you don't learn the way I do things, it's your problem.' So really getting teachers to understand that if the kids aren't learning...the kid's not broken, the teacher's not broken.

We haven't got the right instructional match. (P1, lines 38-41, 45-46)

Administrator P9 stated an individual's *vision* might also be persuaded because "the tools you put into it, the personnel you put into it, create whatever product you're going to get at the end of that" (lines 137-138) and shifting a *vision* was easier if everyone was going through the same training and implementation, "Not everybody is always fully involved in the process, but it's hard to avoid it if the whole school uses this same language" (P9, lines 220-222).

One of the more challenging components to systemic change for one administrator was changing teacher *beliefs* or philosophy:

Getting teachers to change, in some cases, helping teachers change their beliefs about instruction and their beliefs about kids who learn in different ways. And I guess really shifting the focus from student behavior to teacher behavior and that what needed to change was "us" not the kids....So really getting teachers to understand that if kids aren't learning it's the teacher. Not the teacher-person problem, but the instructional-

practices-problem; That there is not a match between the strategies and instructional activities. (P1, lines 35-38, 40-43)

P9 felt the stage was set for change, for teacher *buy-in*, but if the resource examples that were demonstrated in the UDL training were not available during the actual implementation of UDL, then the outlook for UDL was weak.

We had plowed the field and it was ready for planting with UDL, but once you get there, teachers want the things they know will work best.... It's fine to talk about environments where you can practice UDL without technology-rich application, but what you're really doing is giving a great builder a hammer instead of a power tool and that means more human effort and that eventually, those folks will wear-out with it what if you can't find a way to speed that process up. (P9, lines 49-51, 52-56)

As stated by P9 teachers would change their philosophy when they felt they needed to, and had the support to back the change:

I think UDL is often about, like lots of learning, it has to be, you have to have the things there when people are ready to have them... You can give me a training, but in absence of real need, the training is kind of academic and not very applied yet. On the day that I need to create something for my classroom, that's when I need someone available to me to help me connect the dots again. (lines 102-103, 104-106)

Interview General Conclusions

Regarding perceptions of UDL from the teacher and administrator interviews, all teachers implementing UDL felt that (a) they had basic knowledge of UDL, (b) they understood the potential benefits of UDL, (c) UDL had influenced the teaching and learning process, (d) the UDL components were in place, (e) they experienced some obstacles during the implementation, and (f) they had worries over the implementation of UDL. The majority of the teachers felt (a) they collaborated with colleagues to assist them in planning with UDL, (b) they experienced successes, (c) UDL was well supported, and (d) that they felt *good* about UDL. Most teachers were aware that (a) UDL was part of teacher evaluation process and that they were expected to implement UDL in their classroom and (b) after using UDL repeatedly, the process became almost intuitive.

The administrators agreed that there was a mandatory implementation of UDL district wide, but they did not agree on whether UDL was systemic. The administrators interviewed felt UDL could be successful if teachers would see the benefits of UDL, buy into its philosophy, and maintain a generally positive attitude towards the implementation of UDL. The district vision for UDL was that all teachers should implement UDL principles into their lesson design. All professional development throughout the district had underpinnings in the UDL framework. Building leaders and UDL facilitators provided support for teachers and helped to guide a teacher's vision toward UDL.

Part One General Conclusions

The following general overall conclusions are drawn from the observation and interview data results. All levels of implementers and both administrators agreed that attitude affects the implementation of UDL. All the teachers interviewed felt that UDL influenced their *vision* of education or academics. The administrators interviewed felt that not all teachers were making changes in their lesson design to reflect UDL implementation. All first year implementers and two of three teachers with five or more years teaching experience implementing UDL felt that UDL *influenced the teaching and learning* process in their classroom. Implementers across the years *understood the benefits* of UDL, but not all had *successes* with UDL. Teachers with five or more years experience implementing UDL did not mention of the *benefits* of UDL as frequently. However, teachers with five or more years experience implementing UDL also stated that *buying into* the idea of UDL was important to the implementation of UDL. For both administrators, getting all teachers to *buy into* UDL, to make changes to their *beliefs* regarding their teaching philosophy was viewed as an important factor in implementing UDL. The main concern administrators stated was for *buy-in*.

Part Two: Survey Results

A two-section online survey constituted Part Two of the study. The first section of the survey was the 35-question Stages of Concern Questionnaire (SoCQ) from the Concerns-Based Adoption Model (CBAM). The second section of the survey was a 50-question content-validated UDL survey, focusing on General Understanding of UDL, the Application of UDL, Professional Development, Support for UDL, Impact of UDL,

Planning for Individual Students, and Personal Reflections of UDL. Reference to location of CBAM SoCQ and the UDL survey can be found in Appendix C.

Section One: CBAM SoCQ

The survey hyperlink was emailed to 821 potential participants. There were 114 who agreed to participate in section one of the survey. Of the 114, there were 46 who responded to at least one survey question. Of the 46, there were five who either filled in only the demographics or completed less than ten percent of the survey items, resulting in N = 41 and a response rate of 5%.

Demographics

Of the 41 participants, teachers accounted for 66% of individuals who participated in section one of the survey, with a majority of the teachers ranking themselves as Intermediate level users of UDL. Table 4 shows the distribution of demographics, including UDL implementation experience and years in education. It should be noted that the respondents were not to include the current year when answering the demographic question to number of years implementing UDL, so their selection of 'never' might indicate either a first year implementation phase rather than non-existent implementation.

Table 4

Stages of Concern Questionnaire Demographics

SoCQ Demographics (totals) N = 41	Administrator n = 7 (17%)	Other n = 7 (17%)	Teacher n = 27 (66%)
Self-ranked level of UDL use			
Non-user (17%)	1	2	4
Novice user (20%)	0	1	7
Intermediate user (43%)	2	4	12
Old-hand (20%)	4	0	4
UDL implementation experience			
*Never or 0 year (22%)	1	1	7
1 year (12%)	0	2	3
2 years (32%)	2	3	8
3 years (10%)	0	1	3
4 years (2%)	0	0	1
5+ years (22%)	4	0	5
Years of experience in education (2-40 years)			
0-2 years (2%)	0	0	1
3-4 years (10%)	0	0	4
5 or more years (88%)	7	7	22
Number of UDL trainings			
Did not respond (5%)	0	0	2
0 (17%)	0	1	6
1-2 (39%)	0	5	11
3-4 (22%)	2	0	7
5-7 (12%)	4	0	1
8-10+ (5%)	1	1	0

Note: Percent totals are rounded. *Respondents were not to include the current year so 'Never' might indicate either a first year implementation phase or non-existent implementation.

SoCQ: Highest and Second Highest Concerns by Position

Each completed SoCQ survey was hand scored using the protocol established for the survey (George et al., 2006). Raw scores were converted to percentiles based upon the SoCQ Scoring Guide and the percentiles graphed to create a profile of concerns for each respondent. Any incomplete responses were filled in with the average of the other question responses for that stage of concern, according to SoCQ scoring guidelines (George et al., 2006). If a percentile was within one or two points of the highest or second highest concern, the percentile was ranked the same as that level of concern (George et

al., 2006). There were 14 respondents who had multiple highest or second highest concerns percentile scores (see Table 5). If percentile scores were more than 20 points difference from highest concern, the score was not considered a strong concern (George et al., 2006). Once the individual profiles were completed, the profiles were grouped by their position, or role in the district, as indicated on surveys: Administrator, Other, or Teacher. The SoC profiles of each group provided a visual for locating the highest and second highest concern. The Teacher group was then examined further by sorting teachers by implementation year.

The highest stages of concern were then tallied for frequency within each stage and summarized in Table 6. The tallies rather than percentile averages give an indication of the number of individuals at each of the stages of concern. Some individual SoCQ profile scores indicated multiple high concerns or multiple second highest concerns. Therefore, the n for each group and the total N for Table 6 may be larger than actual respondent N . Preliminary results indicated that more than half of those responding to the SoCQ had a highest concern in Stage 0, Awareness. The second highest concern was Stage 1, with Stages 2 and 3 relatively close behind. Reminder to the reader: the Stages of Concern were discussed in detail in Chapter II.

Table 5

Highest Stages of Concern Profiles by Position

Position	Stage 0 (Aware- ness)	Stage 1 (Informa- tion)	Stage 2 (Perso- nal)	Stage 3 (Manage- ment)	Stage 4 (Conse- quence)	Stage 5 (Collabora- tion)	Stage 6 (Refocus- ing)
Administrator	61	57	41	23	21	97*	9
Administrator	96*	63	72	92	21	68	52
Administrator	69	37	12	23	38	97*	30
Administrator	14	69	59	27	82	95*	38
Administrator	99*	48	80	94	30	52	42
Administrator	91*	80	72	69	76	55	65
Administrator	55	91	72	69	71	98*	34
Other	99*	80	89	69	43	72	60
Other	94*	16	70	43	9	7	14
Other	99*	45	72	65	11	25	22
Other	99*	66	85	92	30	55	60
Other	98*	97*	96	83	90	95	81
Other	87*	30	25	11	3	1	1
Other	14	43	41	52	59	88*	60
Teacher	69	93*	76	73	63	72	84
Teacher	99*	93	91	88	38	31	73
Teacher	98*	95	91	83	27	76	65
Teacher	99*	84	83	69	54	55	26
Teacher	94*	57	67	60	9	28	42
Teacher	99*	93	89	88	38	31	52
Teacher	99*	91	83	90	48	44	52
Teacher	87*	84	80	88*	27	88*	52
Teacher	69	63	72*	52	33	72*	26
Teacher	7	84	76	15	21	98*	47
Teacher	99*	80	89	83	48	59	72
Teacher	87*	27	63	83	43	19	42
Teacher	99*	69	78	85	59	64	69
Teacher	99*	84	63	85	7	5	52
Teacher	97*	84	87	39	33	22	38
Teacher	94*	84	41	60	19	36	20
Teacher	94	45	45	97*	43	16	94
Teacher	99*	97*	92	88	48	40	69
Teacher	61	57	57	60	16	64*	34
Teacher	99*	93	78	83	38	48	65
Teacher	87	80	89*	85	43	59	34
Teacher	94*	60	57	80	30	48	60
Teacher	99*	95	94	83	76	68	84
Teacher	14	66	67*	65	16	68*	26
Teacher	99*	60	78	83	11	25	52
Teacher	40	43	76	43	96*	97*	92
Teacher	22	19	28	18	8	44*	14

Note. Bold = Highest and second highest concerns; * = Highest concern

Table 6

Tallies of Highest and Second Highest Stages of Concern by Primary Role

SoC Highest Concern	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Number of Administrators	3	0	0	0	0	4	0
Number of Others	6	1	0	0	0	1	0
Number of Teachers	18	2	3	2	1	7	0
Total (N = 48*)	27	3	3	2	1	12	0
Percent (rounded)	56%	6%	6%	4%	2%	25%	0%

SoC Second Highest Concern	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Number of Administrators	2	2	0	2	1	0	0
Number of Others	0	1	4	1	0	1	1
Number of Teachers	4	12	8	9	0	0	3
Total (N = 51*)	6	15	12	12	1	1	4
Percent (rounded)	12%	29%	24%	24%	2%	2%	8%

Note: The *n* for each group and the total N may be larger than actual respondent N due to multiple high concerns for some individuals.

Visual representations of only the highest concerns are profiled by position in Figure 3. The raw scores of all individuals in each group were averaged to find the group profile (George et al., 2006). Once the average of the each stage was found, the SoC protocol was used to identify the corresponding percentile. Figure 3 shows Administrators had high concerns in Stage 5 (Collaboration). The Others group and Teacher group profiles shows the highest concern in Stage 0 (Awareness). It should be noted that in creating the group profiles, very high or very low individual scores may influence the group profiles. For example, in Table 6, when using tallies of individual profiles, the teacher highest concern is Stage 0 and second highest concern is in Stage 1. When the raw scores of the individual profiles are averaged, as per SoCQ protocol, the

profile becomes more flat and the resultant group profiles (see Figure 3) are slightly different than in Table 6.

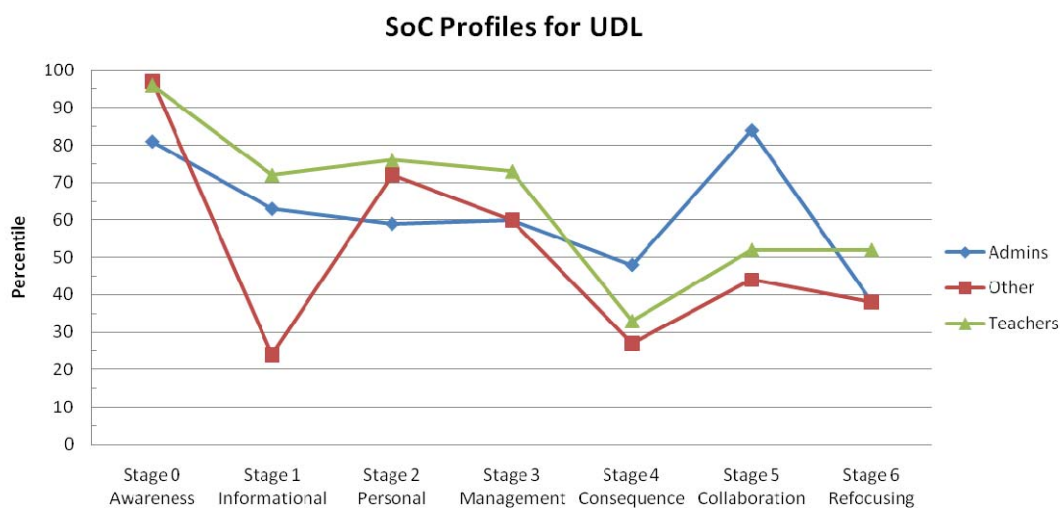


Figure 3. Stages of Concern Profiles by Position

SoCQ: Highest Concerns by UDL Implementation Year

The Stages of Concern (SoC) data were then organized by the number of full school years that teachers had been implementing UDL (see Table 7). The total number of teachers examined was $N = 27$. Table 7 also shows there are only five teachers who have less than five years experience in education, which means over 80% of the teachers who participated in this section of the survey have more than five years teaching experience.

Table 7

Stages of Concern by UDL Implementation Year

Full Yrs Implementing UDL	Years in Education	Position	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Never	3	Teacher	69	*93	76	73	63	72	84
Never	17	Teacher	*99	93	91	88	38	31	73
Never	7	Teacher	*98	95	91	83	27	76	65
Never	30	Teacher	*99	*97	92	88	48	40	69
Never	4	Teacher	14	66	*67	65	16	*68	26
Never	13	Teacher	*99	91	83	90	48	44	52
Never	35	Teacher	*99	84	63	85	7	5	52
1	3	Teacher	*94	60	57	80	30	48	60
1	22	Teacher	*94	57	67	60	9	28	42
1	10	Teacher	*99	93	78	83	38	48	65
2	5	Teacher	*99	84	83	69	54	55	26
2	7	Teacher	*99	93	89	88	38	31	52
2	13	Teacher	69	63	*72	52	33	*72	26
2	2	Teacher	*99	95	94	83	76	68	84
2	14	Teacher	*99	60	78	83	11	25	52
2	22	Teacher	*99	80	89	83	48	59	72
2	16	Teacher	*87	84	80	*88	27	*88	52
2	20	Teacher	87	80	*89	85	43	59	34
3	10	Teacher	7	84	76	15	21	*98	47
3	7	Teacher	40	43	76	43	*96	*97	92
3	23	Teacher	*94	84	41	60	19	36	20
4	4	Teacher	22	19	28	18	11	*44	14
5	15	Teacher	*99	69	78	85	59	64	69
5	39	Teacher	61	57	57	60	16	*64	34
5	40	Teacher	*87	27	63	83	43	19	42
5	8	Teacher	*97	84	87	39	33	22	38
5	32	Teacher	94	45	45	*97	43	16	94
Total *Highest (Second Highest) Concerns			*18 (4)	*2 (12)	*3 (8)	*2 (9)	*1 (0)	*7 (0)	*0 (3)

Note. Bold = Highest and second highest concerns; * = Highest concern.

The teacher group SoC profiles (by implementation year) were created following the analysis protocol described earlier and are depicted in Figure 4. Each subgroup number of teachers (*n*) is also indicated. All teacher groups had the highest concern levels in Stage 0, except those in year three who have highest concern in Stage 5. It should be noted that the profile constructed for implementation year four was done based on the SoCQ scores of only one teacher participant.

Stages of Concern profiles are typically analyzed for a specific pattern. When looking at implementers over time during the implementation of an innovation and using the SoCQ, the profiles should show what appears to be a wave moving across the graph. So, if one was to plot the stages of concern over the course of a few years, the peak (or the highest concern) would appear to move across the graph as a wave. The peak would not necessarily begin in Stage 0 and end in Stage 6, but the movement would progress from left to right. The pattern found in Figure 4 revealed an atypical pattern in the peak (or highest concern) for each group of implementers. The profiles of highest concerns between implementation years did not move in a wave-like pattern, but stagnated at Stage 0 for the first three years of implementation and for teachers with more five or more years implementing. Teachers with three and four years of implementation had their highest concern in Stage 5. The graph lines representing years 0, 1, and 5 also tail-up at the end, which has significance and will be discussed in Chapter V. Implications for patterns, trends, and tailing-up are also discussed in Chapter V.

Part One Connection to Stages of Concern

This section briefly connects findings from Part One of the study to the SoCQ results. Scattered throughout Part One and seen most predominantly in the Stages of Concern is that the teachers were concerned about UDL. In Part One, teachers interviewed *worried* about the implementation of UDL because of financial budget cuts, the lack of technology, time, and *support* to efficiently implement UDL. Not all teachers were ‘on-board’ with UDL (*buy-in*) and there was an overall *worry* of meeting student needs. The SoCQ results showed that most teachers had concerns in Stage 0, Awareness.

Stage 0 concerns indicate that there is something other than UDL on the minds of the implementers. UDL was not a priority at the time. Nearly 50% of the teachers responding to the SoCQ were also concerned about the *organization* and purpose of UDL, as represented in Figure 4, Stage 3 percentiles.

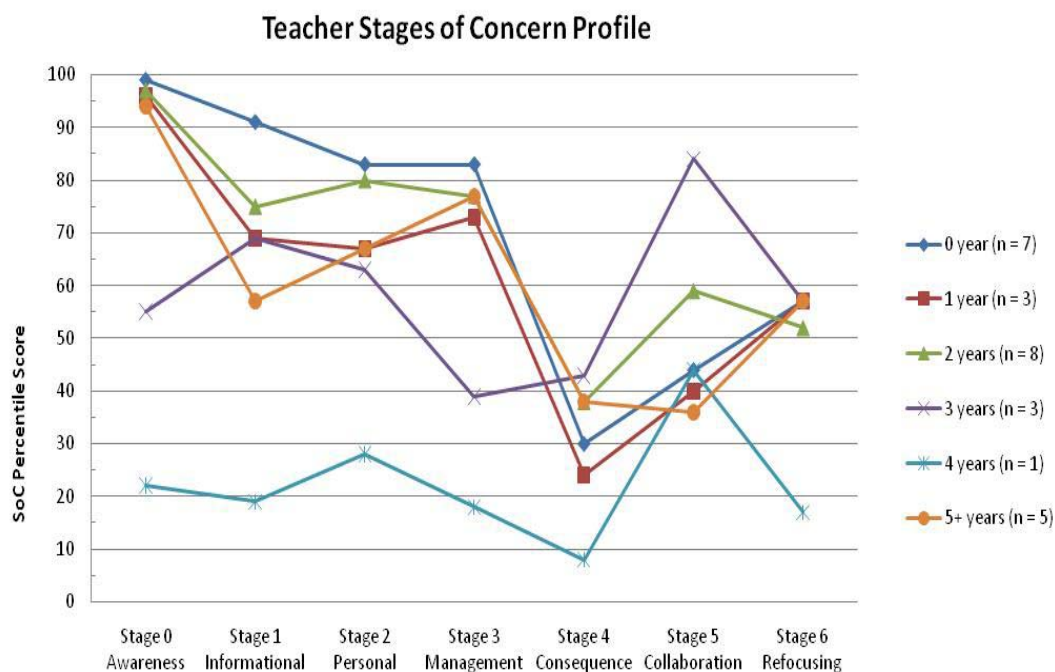


Figure 4. Stages of Concern for Teachers by Year of UDL Implementation

Teachers who were interviewed stated they had a basic understanding of UDL, but felt more training was needed. Teachers in Part One described how collaboration assisted them in implementing UDL, but the SoC profile for third year implementers showed that they were concerned about collaboration.

Part Two, Section Two: UDL Survey

The second section of the survey examined UDL basics and can be found in Appendix C. The UDL survey was composed of seven areas, General Understanding of UDL, Application of UDL, UDL Professional Development, Support for UDL, Impact of UDL, Planning for Individual Students, and Personal Reflection. Each area, or construct, was examined for overall responses and then teacher responses across implementation years. The teachers were grouped into equitable groupings of years of implementation for some of the statistical analysis. Any survey with less than 10% complete was not included in the analysis. Four respondents supplied an interview code number on the UDL survey.

Of the 821 potential participants, 60 agreed to the online consent to participate in the second half of the survey and completed at least one survey item, with three respondents completing less than ten percent of the survey, $N = 57$, resulting in a response rate of 7%. Participants of the UDL survey may or may not represent the same participants described in the first half of the survey, (the CBAM SoCQ), therefore the demographic data specific to the UDL survey respondents are provided separately in Table 8.

Demographics of UDL Survey

Of those indicating their primary role and year of implementation, nearly 72% were teachers, while administrators and others were each over 14%. A large percentage of participants (44%) identified themselves as an Intermediate level user of UDL, followed by those who considered themselves either an Old-hand users (23%) or Novice

(21%). The greatest percentage (25%) of participants had two years UDL implementation experience, 3-4 years of UDL training (30%), and five or more years experience in education (86%). Detailed demographic information of those who participated in the UDL survey component of the study can be seen in Table 8.

Table 8

UDL Survey Demographics

UDL Survey Demographics (totals) N = 57	Administrator n = 8 (14%)	Other n = 8 (14%)	Teacher n = 41 (72%)
Self-ranked level of UDL use			
Non-user (12%)	1	3	3
Novice user (21%)	0	1	11
Intermediate user (44%)	3	2	20
Old-hand (23%)	4	2	7
UDL implementation experience			
*Never or 0 year (14%)	1	3	4
1 year (14%)	1	1	6
2 years (25%)	0	1	13
3 years (21%)	2	2	8
4 years (5%)	0	1	2
5+ years (21%)	4	0	8
Years of experience in education (2-40 years)			
Did not respond (4%)	1	0	1
0-2 years (7%)	0	2	2
3-4 years (4%)	0	0	2
5 or more years (86%)	7	6	36
Number of UDL trainings			
Did not respond (7%)	1	0	3
0 (12%)	0	2	5
1-2 (26%)	0	3	12
3-4 (30%)	1	3	13
5-7 (23%)	6	0	7
8-10+ (2%)	0	0	1

Note: Total percents are rounded. *Respondents were not to include the current year so 'Never' might indicate either a first year implementation phase or non-existent implementation.

UDL Survey Constructs Results

Figures 5-11 show the results of each construct of the UDL survey. For the majority of questions in the construct measuring General Understanding of UDL, participants ratings fell in the ‘very true of me now’ category, but for two of the questions (Q2 and Q3), participants marked ‘somewhat true’ and ‘very true’ almost evenly. Question 2 asked participants, *I have enough knowledge of UDL to integrate its principles into my lesson planning*, while Question 3 asked, *I need more or ongoing professional development in UDL*.

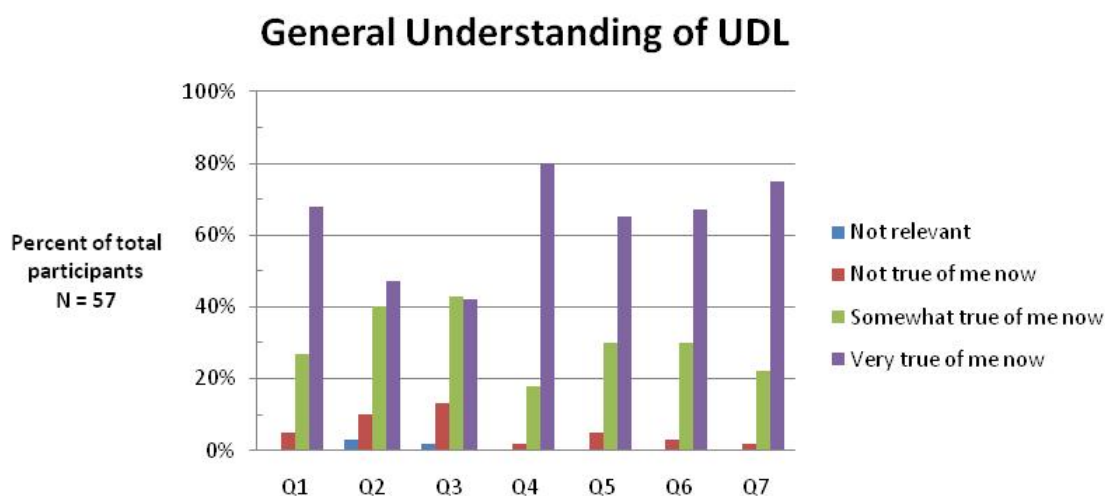


Figure 5. Section two survey questions 1-7 focused on general understanding of UDL

Questions 8-21 (see Figure 6) focused on the application of UDL. More than half of the questions were rated ‘very true.’ Three of these questions revealed a larger difference (>20%) between the percentage of respondents rating ‘very true’ and ‘somewhat true’. (Q11: *I present curriculum information to students in a variety of ways*, Q19: *UDL will continue to influence my lesson planning*, and Q20: *I include the use of technology in my lesson planning*.) Otherwise, the remaining questions had almost equal

representation of the percentage of respondents marking positive anchors (i.e., ‘very true’ or ‘somewhat true’). More participants rated Q8, *I would like to know how to present my (UDL) lessons in my classroom* and Q16, *I plan lessons in collaboration with special education teachers, focusing on curriculum goals* as ‘somewhat true’. Q12, *In planning lessons, I refer to the UDL guidelines checklist* was the highest rated ‘not true of me now,’ which will be discussed further in Chapter V.

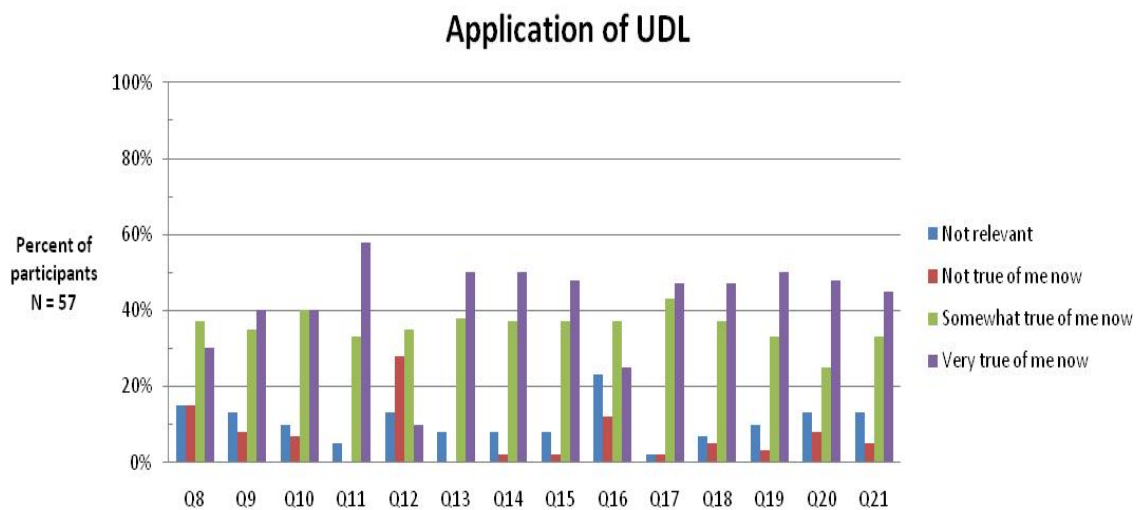


Figure 6. Questions 8-21 reflect the application of UDL in the teaching and learning process

For two of the three questions in the construct measuring UDL Professional Development, (see Figure 7) participant ratings fell in the ‘very true’ category. For one question, Q22, participants marked ‘somewhat true’ and ‘very true’ almost evenly. Question 22 asked, *The UDL training (professional development) helped me to understand and implement UDL into the teaching process.*



Figure 7. Professional development and training for UDL

Participants rated seven of the ten questions in the construct, Support for UDL, as ‘very true’ with two of the questions, (Q25 & Q31), marked almost evenly with ‘somewhat true’ ratings (see Figure 8). Q25 asked participants, *I have a mentor or someone I can collaborate/consult with regarding UDL*. Q31 asked participants, *My administrator arranges teacher plan time or schedules special time so that I can collaborate with colleagues around UDL lesson planning*. Participants rated three questions, Q26, 28, 29, ‘not true.’ Q26 asked participants, *I am a UDL mentor or a ‘go-to’ person for others in the building*. Q28 asked participants, *I have time in my daily schedule to collaborate with colleagues regarding UDL*. Q29 asked participants, *I have time in my weekly schedule to collaborate with colleagues regarding UDL*.

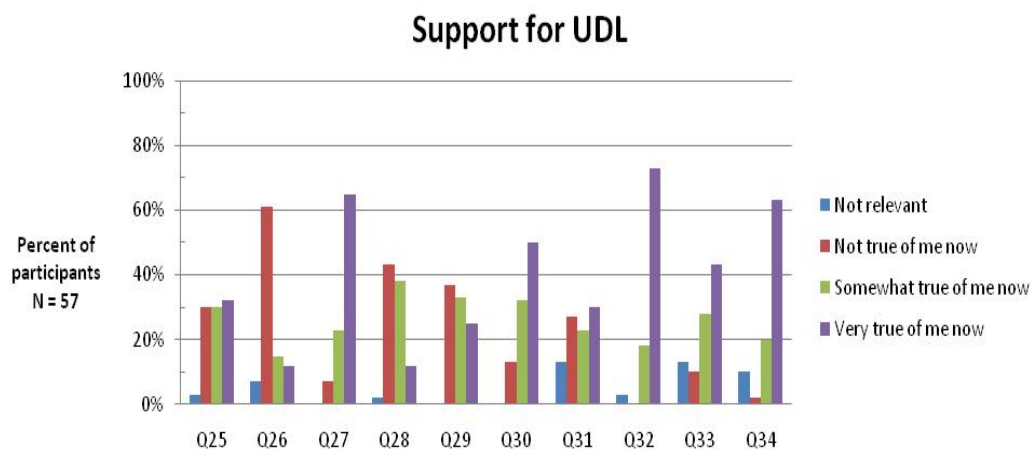


Figure 8. Survey response results regarding support for UDL

For the survey construct, Impact of UDL, seen in Figure 9, participants rated three of the eight questions ‘very true’ and two ‘somewhat true.’ However, for three of the questions (Q38-40), participants marked ‘not true’ with Q38 having the highest percentage of respondents rating ‘not true.’ Q38 asked participants, *I have heard parents commenting on UDL*. Q39 asked, *I have heard discussions of or been a part of UDL in the teachers’ lounge/cafeteria or other informal meetings* and Q40 asked, *I have spoken to parents about UDL*.

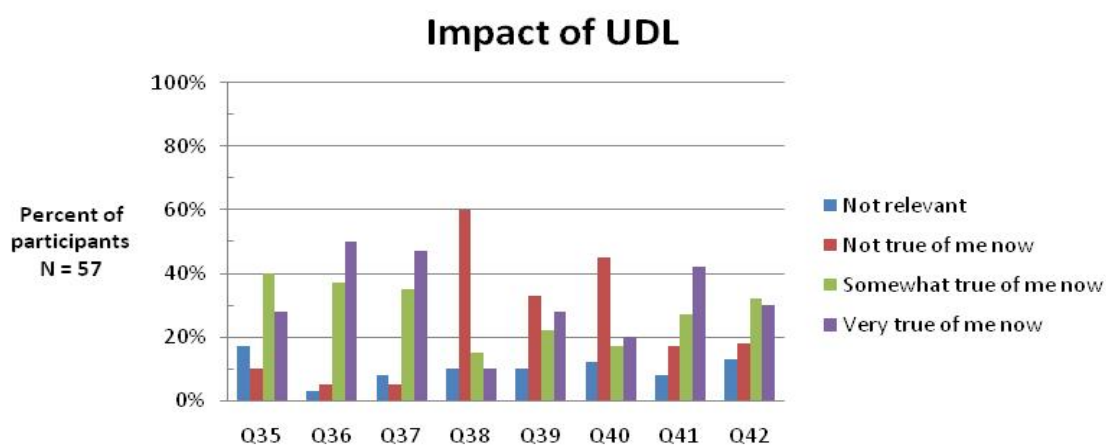


Figure 9. Survey questions regarding the impact of UDL

Figure 10 illustrates questions 43-47. For the construct, Planning for Individual Students, the majority of participants rated the questions as ‘very true’. Questions 43-45 asked participants to indicate their accommodation level and awareness of specific needs of students. The survey items were, (Q43) *I make accommodations for individual students*, (Q44) *When I create a lesson or unit, I write down ways to help the struggling students*, and (Q45) *I am aware of specific needs of students*. Although most respondents indicated ‘very true’ there were a number of participants who indicated ‘somewhat true’. Nearly 90% of participants rated Q47 ‘very true.’ Q47 asked participants, *I know that making accommodations for individual students may benefit other students*.

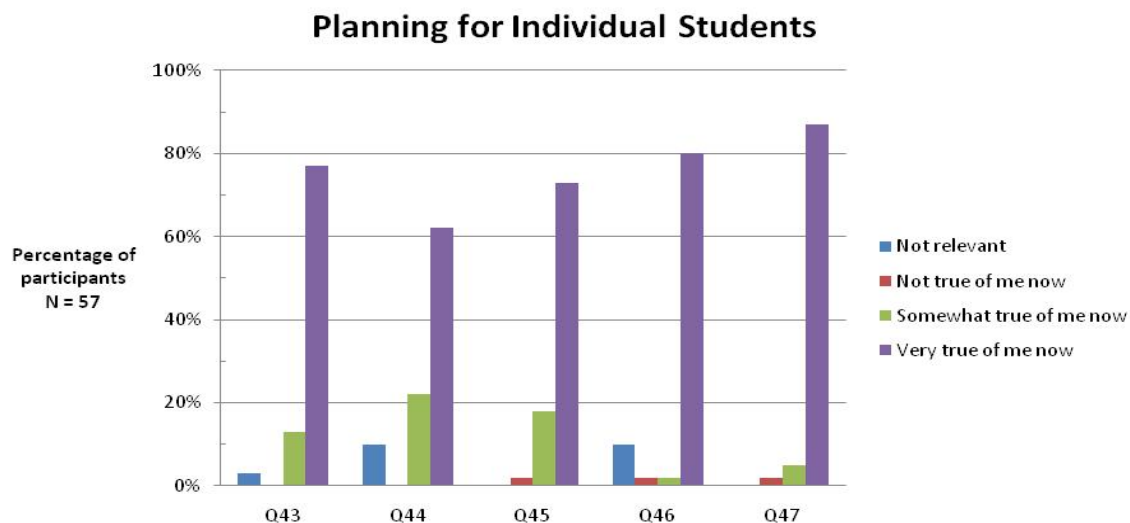


Figure 10. Planning and accommodating for individual student needs

For all three questions in Figure 11, the construct measuring Personal Reflections, participant ratings fell heavily on the positive end of the rating spectrum. Question 48 had more participants mark ‘somewhat true’ compared to Questions 49 and 50, which had

more participants mark ‘very true’. Question 48 asked participants, *I have always taught this way (similar to the principles of UDL); UDL has not changed my lesson planning.*

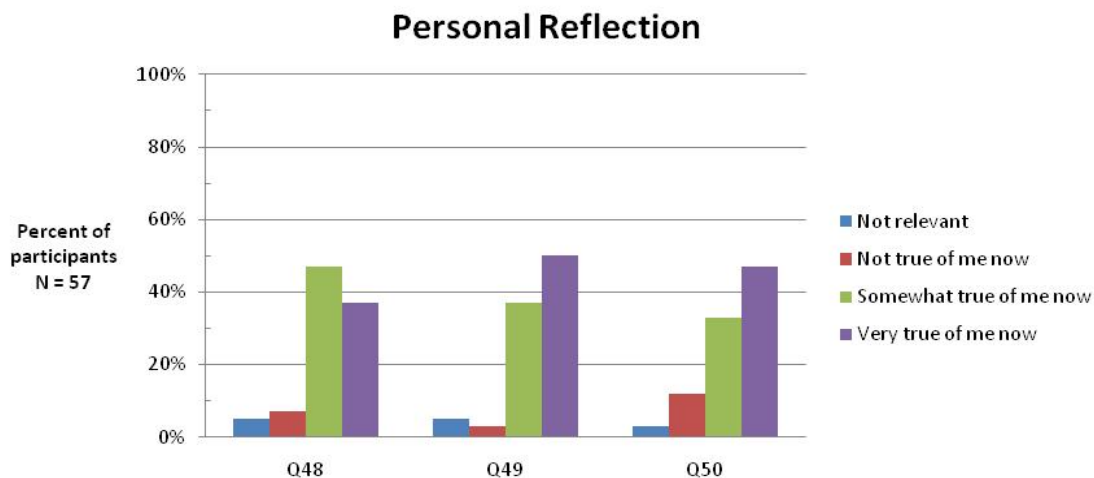


Figure 11. Teacher personal reflections of UDL influences

Statistical Analysis of the UDL Survey

With consideration of creating equitable groups for analysis, the total teachers (N = 41) were grouped by implementation year. One group included teachers with no experience or first year implementers, $n = 10$. The second group included teachers who had been implementing UDL for two years, $n = 14$. The third group included teachers who had been implementing UDL for three or more years, $n = 17$. Levene’s test was calculated for each of the seven ANOVA’s. All p values for Levene’s test were greater than .05, as seen in Table 9. Thus, the equal error variance among groups assumption was not violated.

Table 9

Levene's Test of Variance

Construct (Questions)	Levene Statistic	Sig.
General Understanding (1-7)	.571	.637
Application of UDL (8-21)	1.133	.348
UDL Professional Development (22-24)	1.632	.198
Support for UDL (25-34)	.721	.546
Impact of UDL (35-42)	.202	.894
Planning for Individual Students (43-47)	1.360	.270
Personal Reflection (48-50)	1.692	.186

Analysis of variance (ANOVA) was conducted to compare responses of UDL survey constructs for differences between the three groups of teachers implementing UDL. For tests statistically significant at $p < .05$ on the ANOVA, Tukey post hoc analyses were completed to determine where the groups differed.

The construct General Understanding of UDL, which was comprised of Questions #1-7, was examined first. The sums of Q1-7 item responses created the General Understanding of UDL construct score. Mean total of the sum scores of the General Understanding of UDL construct was 39.37 (SD = 6.27). Analysis of variance showed there was no statistical difference between group means for UDL Survey Category General Understanding of UDL, ($F((2, 40)) = 1.81, p = .177$).

The construct Application of UDL, was comprised of Q8-21 and the sums of those items created the construct scores for Application of UDL. The construct Application of UDL includes planning and presenting lessons with UDL principles, collaborating with colleagues regarding UDL, and the use of technology in lesson design.

Mean total of the sums of the Application of UDL construct was 66.22 (SD = 16.11). Analysis of variance showed that Application of UDL was statistically significant, ($F((2, 40)) = 3.99, p = .027$). Post hoc comparisons of the teacher groups using Tukey HSD test indicated a statistically significant difference between the means of teachers in year 0-1 (M = 54.90, SD = 17.93) and year-3 (M = 71.59, SD = 14.73), $p = .022$. No other group comparisons were statistically significant at $p < .05$ (Table 10). Results suggest there is a difference in applying UDL strategies for teachers who are either non-users or just beginning to implement UDL, compared to teachers with three or more years experience implementing UDL. Based upon these teachers and the results of the ANOVA and Tukey post hoc test, teachers in implementation year 0-1 apply UDL less than those teachers with three or more years of UDL implementation experience. There are notable differences in the teacher perceptions between the UDL survey results and the results found in Part One. The differences in perception will be discussed in Chapter V.

Table 10

Tukey HSD: Application of UDL (Q8-21)

Implementation Year - Group Comparisons		Std. Error	Sig.
Year 0-1	Year 2	6.22	.109
	Year 3+	5.99	.022*
Year 2	Year 0-1	6.22	.109
	Year 3+	5.42	.764
Year 3+	Year 0-1	5.99	.022*
	Year 2	5.42	.764

*Note. Significant at the 0.05 level

The construct Professional Development, was comprised of Q22-24 and the sums of those items created the construct scores for Professional Development. Mean total of the sums of Professional Development was 14.00 (SD = 5.29). Analysis of variance showed there was no statistical difference between group means for UDL Survey Category Professional Development of UDL, ($F((2, 40)) = 1.67, p = .202$).

The construct Support for UDL, was comprised of Q25-34 and the sums of those items created the construct scores for Support for UDL. Mean total of the sums of Support for UDL was 42.20 (SD = 12.64). Analysis of variance showed that Support for UDL was statistically significant, ($F((2, 40)) = 6.62, p = .003$). Post hoc comparisons of the teacher groups using Tukey HSD test indicated a statistically significant difference between the means of teacher year 0-1 (M = 33.40, SD = 13.92) and year-3 (M = 49.12, SD = 10.65), $p = .003$. No other comparisons were statistically significant at $p < .05$ (see Table 11). Results suggest that there is a difference in how teachers perceive support for UDL. The differences appear between teachers who are either non-users or just beginning to implement UDL and teachers with three or more years experience implementing UDL. A higher mean (M) sum score for teachers in implementation year 3+ indicates that teachers experienced in implementing UDL perceived a higher level of support than those teachers with 0-1 years of implementation experience. There are notable differences between Part One data regarding *support* for UDL and the UDL survey data. These differences will be discussed in Chapter V.

Table 11

Tukey HSD: Support for UDL (Q25-34)

Implementation Year - Group Comparisons		Std. Error	Sig.
Year 0-1	Year 2	4.62	.329
	Year 3+	4.45	.003*
Year 2	Year 0-1	4.62	.329
	Year 3+	4.03	.076
Year 3+	Year 0-1	4.45	.003*
	Year 2	4.03	.076

*Note. Significant at the 0.05 level

The construct Impact of UDL, was comprised of Q35-42 and the sums of those item responses created the Impact of UDL construct score. Mean total of the sum scores of Impact of UDL construct was 28.98 (SD = 12.95). Analysis of variance showed there was no statistical difference between group means for UDL survey construct Impact of UDL, ($F((2, 40)) = 1.79, p = .181$).

The construct, Planning for Individual Students, was comprised of Q43-47. The sums of Q43-47 item responses created the Planning for Individual Students construct score. Mean total of the sum scores of the construct, Planning for Individual Students, was 30.24 (SD = 6.87). Analysis of variance showed there was no statistical difference between group means for UDL survey construct Planning for Individual Students, ($F((2, 40)) = .29, p = .748$).

The construct Personal Reflection, was comprised of Q48-50 and the sums of those items created the construct scores for Personal Reflection. Mean total of the sums of the Personal Reflection construct was 14.76 (SD = 4.15). Analysis of variance showed that Personal Reflection was statistically significant, ($F((2, 40)) = 4.73, p = .015$). Post

hoc comparisons of the teacher groups using Tukey HSD test indicated a statistically significant difference between the means of teacher year 0-1 ($M = 11.80$, $SD = 5.05$) and year-3 ($M = 16.47$, $SD = 3.48$), $p = .011$. No other group comparisons were statistically significant at $p < .05$ (see Table 12). Results suggest that there is a difference in the personal reflections of UDL. Teachers who are non-users or just beginning to implement UDL and teachers with three or more years experience implementing UDL felt differently whether UDL changed their way of teaching, if UDL will continue to influence their teaching, and if they believed UDL would be around for a while. The higher mean (M) for Year 3+ indicates teachers experienced in implementing UDL felt more strongly that UDL has influenced their teaching, that UDL will continue to influence their teaching, and that UDL will be around for a while. There are notable differences in teacher perceptions between Part One data results and the UDL survey regarding the level of influence UDL has had on teaching and learning. The differences will be discussed in Chapter V.

Table 12

Tukey HSD: Personal Reflection

Implementation Year - Group	Comparisons	Std. Error	Sig.
Year 0-1	Year 2	1.58	.155
	Year 3+	1.52	.011*
Year 2	Year 0-1	1.58	.155
	Year 3+	1.38	.446
Year 3+	Year 0-1	1.52	.011*
	Year 2	1.38	.446

*Note. Significant at the 0.05 level

A Pearson test of correlation was conducted to assess the relationship between the UDL Survey constructs and the number of years teachers have been implementing UDL (see Table 13). While there were four correlations identified as statistically significant at $p = .05$, the strength of all the correlations ranged from weak to moderate. These preliminary results suggest that there is minimal direct or important effect in the construct areas based upon the teacher's years of experience implementing UDL.

Table 13

Pearson Correlations of UDL Survey Constructs by UDL Years of Experience

		Sig. Correlation	Correlation Strength
General Understanding of UDL	Pearson Correlation	*.347	Low
	Sig. (2-tailed)	.026	
Application of UDL	Pearson Correlation	*.430	Moderate
	Sig. (2-tailed)	.005	
UDL Professional Development	Pearson Correlation	.115	Negligible
	Sig. (2-tailed)	.476	
Support for UDL	Pearson Correlation	*.408	Moderate
	Sig. (2-tailed)	.008	
Impact of UDL	Pearson Correlation	.219	Low
	Sig. (2-tailed)	.170	
Planning for Individual Students	Pearson Correlation	-.040	Negligible
	Sig. (2-tailed)	.805	
Personal Reflections	Pearson Correlation	*.481	Moderate
	Sig. (2-tailed)	.001	

Note. N = 41. *Correlation is significant at the 0.05 level (2-tailed).

Individual Participant Agreements

After examining the survey data collectively, the responses of those who supplied their interview code number were then examined and compared to the observation and interview data. The participants will be discussed separately. In discussing individual participant results, there may be reference to UDL survey response scores and SoC profiles. Reminder that UDL survey score of 0 indicates ‘not relevant,’ scores of 1-2 indicate ‘not true of me now,’ scores of 3-4-5 indicate ‘somewhat true of me now,’ and scores of 6-7 indicate ‘very true of me now’ and the Stages of Concern descriptors can be found in Chapter I.

Participant P11

The observation data for P11 indicated that this teacher was performing at a Not Yet Evident-Emerging operative level, with an overall operative level mean average of 0.4 (refer back to Table 1). Participant P11’s demographic survey information indicated a self-ranking user level of UDL at the Novice level (Q53). P11 has seven years teaching experience, one year of UDL training or professional development, and is in the first year of UDL implementation, meaning this teacher is a year-0 teacher because a full year of UDL implementation had not been completed.

P11 has a somewhat general understanding of UDL with a mean score of 5.0 on UDL survey questions 1-7, but feels additional training would be beneficial as indicated with a rating of 5 on UDL survey Q3 (*I need more or ongoing professional development in UDL.*) and a mean score of 6.7 on UDL survey questions 22-24 (Professional Development construct). Additionally, P11 described a concern that was felt initially,

“Probably the biggest concern was, and I think this is done a lot, is just throwing around initials and for the longest time, I didn’t know what it was” (lines 9-10). However, P11 did not supply an identifier interview number on the SoCQ so an individual profile of the stages of concern was not available.

The UDL survey had three questions that directly related to the application of UDL principles. The mean of the following UDL survey questions (Q) 13 (*In planning lessons, I provide multiple means of representation*), Q14 (*In planning lessons, I provide multiple means of action and expression*), and Q15 (*In planning lessons, I provide multiple means of engagement*) was at 5.3, indicating P11 felt the UDL components were somewhat in place. Through the interview, P11 stated it was difficult to implement UDL, “I’ve been trying to implement that stuff...I guess just trying to get the stuff implemented, you know just trying to do the stuff” (lines 20, 20-21).

Despite the difficulties P11 had initially, UDL has somewhat influenced the teaching and learning process as indicated by scores of 3, 4, 4, 5 on questions 9, 18, 19, and 49, respectively. (Q9: *I have made UDL part of my daily teaching and learning decision-making*, Q18: *UDL will continue to influence my daily decision-making during the teaching and learning process*, Q19: *UDL will continue to influence my lesson planning*, and Q49: *UDL will continue to influence my teaching*). P11 also described how UDL has influenced decision-making and lesson planning strategies,

It definitely makes me think about the kids in my class more than when I started teaching. I used to think more of high-middle-low and now I think of individual kids and more of styles of learning and not ability levels so

much. I still think of ability levels, but I do think more, too of styles. (lines 29-32)

P11 has not yet made UDL an integral part of the teaching and learning process and questions the possible long-term acceptance of UDL, as indicated with a score of 5 on UDL survey question 36. *I hope UDL will remain an integral part of the teaching and learning process in my building.*

Participant P6

The observation data for P6 indicated an operative level at Intermediate-Advanced and P6's demographic survey information indicated a self-ranking user level of UDL was at the Old-Hand level (Q53). P6 had 32 years teaching experience, three years of UDL training or professional development, and was in the fifth year of UDL implementation.

P6 reported feeling confident in the knowledge of UDL, supported by a mean score of 6.1 on UDL survey questions 1-7, and felt confident in the implementation of UDL in the classroom, with scores of 1 and 2 for UDL survey questions 3 and 8, respectively, (Q3: *I need more or ongoing professional development in UDL*, Q8: *I would like to know how to present my (UDL) lessons in my classroom*).

P6 was somewhat unsure of the need for additional training, with scores of 4 for both UDL survey questions 23 and 24, (Q23: *I would like to see one annual 'refresher' UDL training*, and Q24: *I would like to see ongoing or multiple 'refresher' UDL trainings*), but indicated that the trainings helped to understand and implement UDL, with a score of 7 on UDL survey question 22, *The UDL training helped me to understand and*

implement UDL into the teaching process. In the interview, P6 stated, “We get a lot of support. Our administration supports us” (line 92), but felt that the building support for UDL was only somewhat available, as indicated on the UDL Survey (Support for UDL construct) questions 25-34 (mean score of 4.2).

Further examination of the Support for UDL construct scores for P6 indicated that this participant felt strongly that there is UDL support, as indicated as indicated in scores of 7 for UDL questions 25, 26, and 27, which asked, *I have a mentor or someone I can collaborate/consult with regarding UDL, I am a UDL mentor or a ‘go-to’ person for others in the building and I can find someone in the building to help me with a technology problem I cannot resolve*, respectively. However, P6 did not feel the administrator or team leader was someone who could support her implementation of UDL, as indicated in the rating of 4 for question 30, *I know that if I need help regarding integrating UDL into the teaching and learning process, my administrator, team leader, or UDL leader will help me*. P6 also felt there was minimal collaboration time for UDL planning as indicated with scores of 2, 2, and 1 on questions 28, 29, and 31, respectively. Question 28, 29, and 31 refer to the availability of collaboration time for UDL.

The observation data (see Table 1) shows P6 had most UDL components in place, with performance level Intermediate-Advanced. Additionally, P6 had a score of 7 for each UDL survey questions reflecting the application of UDL principles (Q13: *In planning lessons, I provide multiple means of representation*, Q14: *In planning lessons, I provide multiple means of action and expression*, and Q15: *In planning lessons, I provide multiple means of engagement*), which indicated that P6 felt the UDL components were

in place. P6 described that the UDL components were implemented in the classroom, “[Students] had some flexibility in how they were getting the information from us....We’re trying to give students choices in how they respond...We’re also give them choices as to what activity they’re going to do” (line 23, 49-51). P6 accommodates for individual student needs as indicated by a mean score of 7 for questions 43-47 (UDL Survey construct, Planning for Individual Students).

P6 has seen a positive impact using UDL as indicated on the UDL survey with scores of 6, 7, 6, and 6 for questions 35, 36, 37, and 41, respectively. (Q35: *I have struggling students who have made greater achievement gains since I have integrated UDL principles into the teaching and learning process*, Q36: *I hope UDL will remain an integral part of the teaching and learning process in my building*, Q37: *I have noticed that more students are actively participating in the learning process*, Q41: *I have had some success stories since I have implemented UDL*).

P6 felt positive regarding the long-term potential of UDL as indicated with a mean score of 6.7 for UDL survey construct (Personal Reflection) questions 48 – 50 even though P6 has taught similar to UDL in the past, indicating this participant made minimal changes to the teaching and learning process (Q48: *I have always taught this way (similar to the principles of UDL)*; *UDL has not changed my lesson planning*, Q49: *UDL will continue to influence my teaching*, Q50: *Compared to other education initiatives I have experienced, I think UDL will be around for a long while*).

P6 did not supply an identifier interview number on the SoCQ so an individual profile of the stages of concern was not available.

Participant P7

P7 had seven years teaching experience, four years of UDL training or professional development, and was in the third year of UDL implementation. P7 reported being viewed as a ‘go-to’ person in her building and also viewed as a mentor for UDL, as indicated by her response of *very true of me* now for UDL survey Q26 (*I am a mentor or ‘go-to’ person for others in the building*). There were consistent reports between the observation data, the interview data, and the UDL survey. P7 did supply an identifier interview number on the SoCQ so an individual profile of the stages of concern was available.

The observation data for participant P7 revealed an operative level at Intermediate-Advanced for one observation and Not Yet Evident-Emerging level for the second observation, which supports P7’s self-ranked user level of Intermediate on the UDL survey (Q53). P7 felt very confident in her knowledge of UDL, but needs additional training (Q1-7, 8, 22-24). P7 felt UDL components were in place while creating lesson plans as indicated with scores of 7 for questions 13 – 15. P7 stated in the interview how she included UDL components into teaching “[by] making sure that I have multiple ways of getting that information to the kids” (lines 36-37).

P7 strongly agreed that in her building the support level for UDL was evident as indicated by scores of 7 for questions 25 – 31. Questions 25 - 31 asked participants if they had or were a mentor, (Q25, 26), knew of someone to go-to for UDL help (Q27, 30), if collaboration was part of the support structure (Q28, 29, 31), and if administration assisted in the support for UDL (Q30, 31). P7 also indicated in the interview that the

collegial support was evident in the building, “I feel UDL has opened up pathways to sharing....among colleagues” (lines 78-80).

For P7, UDL has had a positive impact, “I have the kids reading a novel that’s too hard for them....I saw every student in this class engaged in the text today” (lines 152-153, 155) which is consistent with mean score of 6.7 for the UDL survey construct Impact of UDL (Q35-42) .

P7 accommodates for individual student needs as shown by a mean score of 7 for UDL survey construct, Planning for Individual Students (Q43-47). This is also evidenced through the following interview statement,

But can they [students] read a passage and pull out important information, make ties to themselves? They can ALL do that. Now some of them can do it with the whole book, and some of them can do it with one sentence and some of them can do it with a paragraph. (lines 159-162)

P7 felt UDL will be around for a while even though she has taught similar to UDL in the past and UDL will continue to influence the teaching and learning process, as indicated with a mean score of 7 for questions 48 – 50. P7 explained how personally beneficial it was to plan for individualization through UDL, “For me, I plan one thing that is flexible around a big goal and then I can work to push kids the right direction from that big goal and to me it’s [UDL] been very liberating” (lines 25-27).

P7 self-identified on the Stages of Concern Questionnaire. The individual SoC profile for P7 indicated that her highest concerns were in Stages 4 and 5 (Consequence and Collaboration), and her second highest concern was in Stage 6, Refocusing. Based on

SoCQ protocol, these results indicate that P7 is wondering how UDL is affecting students, how UDL might influence student learning, and how she can make UDL better (Stage 4). Not only did she indicate on the UDL survey that she is concerned with improving student outcomes, but she also indicated that she felt comfortable discussing UDL with others, helps others coordinate their implementation of UDL, and is willing to lead others in a collaborative model to implement UDL (Stage 5). The interpretation of the SoC individual profile for P7 indicated that she felt confident enough to make major changes to UDL toward positive improvements, and could possibly have felt that there was something wrong with UDL and could change it for the better (Stage 6).

Participant P3

The observation data for P3 indicated that this teacher was performing at the Intermediate to Advanced operative level, with a mean average of 2.9 (Table 1). P3 has had four years teaching experience and had two years experience implementing UDL. P3 stated in the interview that she was a building facilitator for UDL. She did not self-identify her interview number on the UDL survey, so no data were available for that study component.

P3 felt UDL makes planning easier, but also stated that UDL had not impacted her teaching. “I don’t think it’s been a big change because I, I just, it’s always kind of been my philosophy,” (lines 78-79). Technology had enhanced what she was already doing and with the help of integrating technology into her lessons, P3 had seen an improvement in assessment scores. “My successes have been positive assessment scores...And technology has played a huge role in that” (lines 50, 52).

P3 also had a few concerns regarding the implementation of UDL. Primarily, she felt that the teachers in her building were focusing too much on the UDL concept itself and not how UDL can help with instruction. “I think my biggest concern is making it about UDL, rather than focusing on what is truly important, which is obviously instruction,” (lines 10-12). One other concern she had was when the technology was not operating properly, but she always had a back-up plan, “The only time I really run into a problem is when I have a lot planned, technology-based, and the technology just isn’t cooperating that day...so I always have a backup plan,” (lines 53-55, 59).

The highest stage of concern for P3 was Stage 5, Collaboration, and second highest stage of concern was Stage 2, Personal. Based on SoCQ protocol, high concerns in Stage 5 suggest that P3, in her UDL facilitative role in the building, is comfortable enough to discuss UDL with others, share ideas and help them with the implementation of UDL. Yet, when an individual scores high in Stage 2 like P3, it indicates the individual is concerned about how UDL would affect her personally and could possibly begin to question her role as a facilitator , wondering what recognition or what good will come of being the building facilitator.

CHAPTER V

DISCUSSION

As education became enveloped in NCLB, students with disabilities continued to struggle to meet its stringent requirements. While NCLB theorized that no child would be left behind academically, it posed a problem for students with disabilities who might not be able to meet NCLB's standards. The assumption of NCLB that all students should reach the same academic outcome rebounded with resistance from some parents of students with disabilities and local education agencies, who were complying with the rights inherent in IDEA. As a result, IDEIA 2004 re-aligned itself with NCLB and through the re-alignment, included the use of universal design for learning (UDL) in state and local assessments. With the federal mandate of including UDL in IDEIA 2004, in the Higher Education Opportunity Act of 2008, and the pending inclusion into the 2011 revision of ESEA, districts began to implement UDL into their curriculum design. It was unclear as to how teachers perceived UDL. This study examined teacher perceptions of UDL through qualitative and quantitative measures. The qualitative components allowed for direct representation of individual perceptions of UDL, and the quantitative measures gave a more general, district perception. The study was guided by these questions:

1. What are teacher perceptions of universal design for learning during the implementation process?
 - a. What concerns do teachers have during the implementation of UDL?

- b. How has UDL influenced lesson planning?
 - c. How has UDL influenced lesson presentation and student engagement?
 - d. What changes have taken place during the UDL implementation process?
What has helped maintain the change?
2. What successes and obstacles do teachers encounter during the What systemic changes need to take place in order to implement UDL principles?
- a. What procedural changes occur?
 - b. What physical/entity changes occur?
 - c. What obstacles do administrators encounter during the UDL implementation process? What are the concerns?

Classroom observations, teacher and administrator interviews, and a two-section online survey were used to collect data. The classroom observations primarily assisted in recognizing the operative level of UDL in the classroom while teacher interviews helped supply rich, in-depth information regarding teacher perceptions of UDL. The first section of the online survey was the Concerns-Based Adoption Model (CBAM) Stages of Concern Questionnaire (SoCQ) which profiled individual teacher concerns regarding UDL. The second section of the online survey focused on UDL related to the following areas: General Understanding of UDL, Application of UDL, UDL Professional Development, Support for UDL, Impact of UDL, Planning for Individual Students, and Personal Reflection.

Findings, Implications, and Preliminary Recommendations

This section answers the research questions and provides implications for school districts, UDL facilitators, and teachers implementing UDL. Ideas for future study and preliminary recommendations are briefly discussed and will be detailed in the Recommendations section.

The primary research question, *What are teacher perceptions of universal design for learning during the implementation process?* will not be answered immediately and directly, but rather within the summary of key components of the study and in the context of the secondary questions. A final answer to the primary research question will be discussed at the conclusion of this section. Points referencing codes and themes generated from interview data will be *italicized* in text.

What Concerns do Teachers have During the Implementation of UDL?

The concerns teachers had regarding the implementation of UDL included understanding the basic UDL language, having no time for collaboration, difficulty applying UDL to lesson planning and teaching, and uncertainty of the support level of UDL. Initially, learning the UDL vocabulary was a major hurdle or *obstacle* (P7, P9, P11). Once the vocabulary was understood and teachers had a *general understanding of UDL*, teachers began to share the *common language* of UDL which promoted discussions, *inter-relationships*, and *collaboration* meetings amongst teachers (P2, P7, P8).

Collaboration

The lack of *collaboration* was seen as a concern for some teachers because they had no time daily or even weekly to collaborate with others regarding UDL, as measured by the UDL survey (Q28-29) and the results of the SoCQ (Table 7). Many of the survey respondents did not collaborate with special education teachers (UDL survey: Q16), but felt they planned for individual student needs (UDL survey: Q43-47) and presented curriculum in a variety of ways (UDL survey Q11 and 13-15). As cited in Ellsworth (2000), Ely (1990) stated, “Time is a vital element in the total process of educational change” and that this time should be “Good time. Company time. Paid time” (pp. 300-301).

For school districts wanting to improve collaboration efforts, consider creating an infrastructure that provides time for teachers to collaborate with others, and include collaboration with special education teachers. Teachers should seek out special education teachers and instructional media personnel to gain fresh ideas on how to accommodate for diverse learner needs. During collaboration meetings, special education teachers could provide consultation in planning for individual needs. Instructional media personnel could supply information regarding the potentials of digital media. Districts could benefit from collaboration teams that include special education teachers, general education teachers, and instructional media personnel.

Application and Support of UDL

In Figure 2, readers can see how *collaboration* links to *action*. *Collaboration* directly affected the themes of *inter-relationships* and *support*. *Collaboration* is also directly affected by *sharing a common language*, which in turn, affects *action*. So *collaboration* should be viewed as a major component in implementing UDL and is represented within two UDL survey constructs, Support for UDL and Application of UDL, both of which were found to be statistically significant. For these constructs the Tukey post hoc testing revealed significant differences between Early Implementers of UDL (Years 0-1) and Experienced Implementers (Years 3+). Since the mean (M) is higher for teachers in implementation year 3+ for the UDL survey construct, Support for UDL, this indicates that teachers with experience implementing UDL perceived a higher level of support than those teachers who are new to the UDL implementation experience. Data results from Part One indicated that teachers perceived varying levels of support throughout the district. Based upon the statistical analyses for UDL survey construct, Application of UDL, teachers in implementation year 0-1 apply UDL less than those teachers with three or more years of implementation experience. These data differ from the results found in Part One. Classroom observations revealed that teachers new to UDL were demonstrating higher operative levels of UDL than teachers with more UDL experience. This further suggests that teachers may not know what 'UDL in action' is supposed to look like. It could also be observer effect, in that a teacher's performance could be influenced by someone watching or directly speaking with the participant versus a participant reporting on a survey anonymously.

The Pearson test showed a correlation between years of UDL implementation experience, indicating there is a relationship between UDL experience and teacher perceptions of UDL, particularly in the area of Support for UDL and Application of UDL, as measured on the UDL survey. District UDL facilitators might want to investigate the differences between the Early Implementers and Experienced Implementers.

It is necessary at this point to discuss some areas of concern from the UDL survey constructs, Support for UDL and Application of UDL. The construct Support for UDL included survey items Q25-34. The construct Application of UDL included survey items Q8-21.

Support for UDL included: the resources that might be available to teachers, mentors, collaboration time, technology, and UDL facilitator support. Respondents to the UDL survey indicated they did not have a mentor to assist them with UDL implementation (Q25), but they could find someone to assist them if needed, (Q27 and 30). More respondents indicated that they did not have routine collaboration time and there were mixed responses as to whether the building administrator arranges time to collaborate (Q28, 29, 31). Participants felt they planned for the use of technology to support teaching and learning (Q20-21), were comfortable using technology (Q32) and could show students how to access curriculum information using technology (Q34), but not as many participants indicated that students had access to technology (Q33). Most participants were knowledgeable regarding the integration of technology to support UDL, but some felt the technology was not available. Having resources available to efficiently

implement UDL was a concern (P8, P9). More specifically, the availability of technology resources was an area of concern as measured by teacher interviews (P3, P8, P9) as well as the UDL survey (Q33).

Without necessary resources, systemic change is questionable (Ellsworth, 2000). One participant provided the following analogy to emphasize that without the proper resources to create the flexibility inherent in UDL “what you’re really doing is giving a great builder a hammer instead of a power tool and that means more human effort and that eventually, those folks will wear-out” (P9, lines 53-55). Investigation of the possibility of an underlying ‘burn-out’ factor as teachers experience ongoing years of UDL implementation is necessary.

Implementation of UDL is fundamentally about addressing diverse student needs and teachers are concerned that they might not be meeting the needs of all students (P2, P4, P10, P11). Without the use of technology, teachers expend more energy to accommodate diverse learner needs, and in the course of putting out more effort teachers fatigue more quickly (P4, P9). “One of these days I’ll breathe” (P4, lines 195-196). Curriculum designed with “diverse digital tools and materials, with UDL flexibility built in” (Rose & Meyer, 2002, p. 83) assists in creating a more equitable learning environment for all learners. If districts are designing their curriculum with UDL, digital media would be a component of the curriculum and inherently, districts should strive to improve these resources.

Parents and Community

Although not discussed at length in the Results section, a brief discussion regarding the impact of the implementation of UDL on parents and the community and the position these stakeholders have in the implementation of UDL is needed. As seen in Figure 9, responses for Q38 and Q40 indicated there were many district staff who had not heard parents talking about UDL nor had they spoken to parents about UDL. Ellsworth, (2000) noted, “By mobilizing these stakeholders [parents and community] and providing them with relevant information – and training in appropriate skills – parents, school boards, and other community groups can play a key role in guiding implementation and reducing turbulence” (p. 97). As cited by Ellsworth (2000), Fullan and Stiegelbauer’s 1991 edition of *The New Meaning of Educational Change*, asserts “...educational reform requires the conjoint efforts of families and schools. Parents and teachers should recognize the critical complimentary importance of each other...Otherwise we are placing limitations on the prospects for improvement that may be impossible to overcome” (p. 99).

Districts and teachers should inform parents and community regarding the implementation of UDL and maintain regular correspondence through community information sessions regarding the progress of UDL immersion. Teachers should be proactive in requesting parent involvement with UDL. There may be parents who are adept at technology and can assist in creating instructional resources for teachers, some might be able to volunteer reading to students, or lead small group discussions on

curriculum topics. UDL facilitators should encourage more parent involvement in the day-to-day implementation of UDL within the classrooms.

Stage of Concern Revelations

“If the innovation is appropriate and well-designed and if there is adequate support for its implementation, an individual’s concerns profile plotted over time should look like a wave moving from left to right” (George et al., 2006, p. 37). For the teachers represented in the SoCQ, the profile of highest concern does not move as a wave as the years progress, but idles at Stage 0. Highest concern at Stage 0 means there was something else taking priority, maybe another initiative, an activity teachers were involved with, or a new task they were assigned to do. High Stage 0 does not indicate unwillingness to implement UDL, but suggests the intensity of the effort in implementing UDL (George et al., 2006). Addressing only the highest concern will not adequately give the whole picture of teacher concerns. When utilizing a measure like the SoCQ, it is imperative to look at the highest concern along with the secondary concerns to give a more gestalt interpretation of teacher concerns (George et al., 2006). Table 7 shows Stage 0 as the highest concern overall and Stages 1, 2, 3 as second highest concerns, indicating that teachers were also concerned about the details regarding UDL and requirements for implementing UDL (Stage 1), how UDL might fit into their current role (Stage 2), the demands UDL placed on them personally (Stage 2), how the district’s budget would support UDL (Stage 2), and how to efficiently manage and organize the implementation of UDL (Stage 3). While districts might address only the highest concern, the secondary concerns actually assist in providing a more detailed picture of teacher concerns.

However, districts should note that as the highest concerns become resolved, the secondary concerns might intensify (George et al., 2006).

It is difficult to determine what initiative or activity was a priority for teachers who scored highest in Stage 0. High Stage 0 could also indicate there was no dissatisfaction with status quo, a condition of change identified by Ely (1990). The district administrators would be knowledgeable of other initiatives in place that might be replacing UDL as a priority. If the desire of the district is to focus on UDL implementation, then a re-organization of the district priorities is necessary. Districts should provide professional development for applying UDL into lessons (Stage 1), provide a more detailed explanation of what is expected of teachers regarding UDL implementation (Stage 2), including what their personal commitment might be (Stage 2). Districts should also provide an overview of how UDL might affect a teacher's status (Stage 2), how future UDL professional development will be maintained financially (Stage 2), and provide release time for teachers to observe and collaborate with others in order to improve the organization and management of UDL (Stage 3).

How Has UDL Influenced Lesson Planning? How has UDL Influenced Lesson

Presentation and Student Engagement?

UDL was primarily used as a tool to help teachers plan lessons, but many experienced difficulty in applying UDL to lessons and presenting lessons designed with UDL framework. Teachers also felt UDL designed lessons helped to maintain student interest in the lessons.

The secondary research questions above reflect the universal design for learning principles (Rose et al., 2005). The answers to these questions will be discussed in detail through the observation and survey data and through the code *UDL components*, as revealed in the teacher interviews. The teacher interviews also revealed how these components *affected the teaching and learning process*.

There is evidence, based on the classroom observations (Table 1) and UDL survey results that the *UDL components* were in place. Even for teachers who were ranked at the Emerging operative level during the classroom observations, the *UDL components* were in place to some extent (see Table 1). The UDL survey indicated that when teachers created lesson plans, they included the UDL components/principles (Q13-15). The teachers interviewed also stated that they spent extra time applying the UDL principles and worried about meeting the needs of all students (P2, P4, P6, P8). Since the sums of the scores of the construct Application of UDL were analyzed, it is difficult to determine which specific questions alone were significant. Together with the observation data and teacher interview comments, it can be assumed that the majority of teachers felt they had the *UDL components* or principles in place in the classroom.

During Part One of the study, when asked how UDL affected their lesson planning, presentation and student engagement, most teachers said they thought UDL made planning and teaching easier, by using UDL as a tool to assist them in organizing lessons (P2, P3, P4, P7, P8). A few teachers also stated UDL helped maintain student interest or motivated students who typically were not easily motivated (P3, P6, P10).

Some teachers also stated UDL helped them to individualize lessons for students (P6, P10, P11).

In summary, teachers in this district viewed UDL as a tool to help plan lessons, but personally felt they needed assistance in implementing or the “how-to” of UDL in the classroom. This indicates that teachers had a general understanding of UDL and could incorporate its principles into planning, but the actual application of UDL, the “how do I do it?” component was where they doubted themselves. While it is difficult to determine the district viewpoint, all teachers interviewed felt that applying UDL into lesson design helped to increase student motivation and engaged learning.

Districts should assist teachers through demonstrations, role-play activities, and release time to observe the application of UDL into the classroom. Allowing UDL facilitators into the classrooms to evaluate the teacher’s implementation of UDL through a non-threatening process could encourage teachers to reflect on the process and make changes toward the application of UDL into the classroom, without feeling a direct threat to their status or professional evaluation.

Districts should strive to create the curriculum in the UDL framework at the district level. Embedding UDL at the district level frees the teacher to make decisions on how the curriculum will be delivered to the students, not in trying to re-design the lessons to fit the UDL model. Curriculum designed with UDL as a framework should include a multi-tiered, scaffold design described by Tomlinson (1999), the use of digital media (Edyburn, 2010; Rose & Meyer, 2002), and assessments available in multiple formats (IDEIA 2004).

What Changes have Taken Place during the UDL Implementation Process?

What has Helped Maintain the Change?

The two areas that changed as a result of UDL implementation, based on teacher interviews, were technology and *relationships*. This section addresses changes that have taken place as a result of implementing UDL. Some changes discussed may be systemic while others may be building or teacher specific.

Teachers saw either more technology, updated technology, or a shift in the focus of using technology (P3, P8, P11). Some reported the use of technology had increased because of UDL. The range of opinions regarding the use of technology and UDL between the interviewees suggests whether the role of technology in UDL has been accurately defined. This study did not reveal enough data regarding the level of technology use while implementing UDL and should be considered as an area of future study.

The second change teachers noticed was an increase in teacher *collaboration* or communication amongst teachers and that *sharing a common vocabulary* helped maintain the change (P2, P6, P7, P9). Most teachers interviewed felt *inter-relationships* were important, even if they stated that the *relationships* did not exist in their building. *Relationships* were thought to be supported by sharing a *common language* through *collaboration*. Teachers indicated relationships and collaboration to be an important factor in implementing UDL, yet collaboration was not possible for most teachers, as indicated on the UDL survey results (Q28-29), and discussed earlier as a concern.

Districts should assist in supporting UDL and improve relationships amongst teachers by providing opportunity for collaboration. Teachers should have time to discuss or share UDL ideas with other teachers. One interviewee identified that a working-lunch time one day per week was an opportunity for collaboration. However, districts should consider providing a more solid infrastructure for such opportunities.

What Successes and/or Obstacles Do Teachers Encounter

During the Implementation Process?

This secondary research question will be answered through the results of the UDL survey and interview data. Teachers encountered various successes and obstacles during the implementation of UDL. There were commonalities amongst teacher success stories, but most obstacles teachers encountered were unique to each teacher.

Teacher interview data revealed that some teachers felt a major success that occurred during the implementation of UDL was improved student engagement in lessons (P4, P6, P10, P11). Since students had choices in how they could interact with the lesson, the off-task behaviors decreased and students became more involved in the lessons. Some participants felt student outcomes and assessment scores also improved due to implementing UDL (P2, P3, UDL survey Q35). The depiction of the major themes in Figure 2 and their relationships show the code *success* is influenced by *behavior of students* (engagement) and *academic improvements*.

A closer look at the UDL survey regarding successes and obstacles (Figure 9) shows that more teachers have had successes (Q41) than obstacles (Q42). Approximately 75% of respondents had successes (Q41) during the implementation of UDL while

approximately 65% of respondents ran into obstacles during the implementation of UDL, as indicated by the responses to Q41 and Q42. Likewise, some respondents had many successes and minimal obstacles during the implementation of UDL, others had few successes and many obstacles, and some had neither successes nor obstacles, as indicated by their response ratings on the UDL survey.

The obstacles teachers described during the interviews included (a) difficulty with the UDL language, (b) meeting the needs of students through UDL, (c) applying UDL components, (d) covering the state standards using UDL, (e) staying student-centered while incorporating UDL principles, (f) the technology equipment not working, (g) not having instructional resources, and (h) larger class sizes. Although the obstacles were primarily teacher-specific, the teachers with one year implementation experience, (P2, P4, P10), described obstacles that were more UDL-related (items a-e, previously) and teachers with five or more years implementation experience, (P6, P8, P11), described obstacles unrelated to UDL (f-h). Districts should be aware of this difference and assist Early Implementers in resolving the issues or obstacles and possibly utilize the Experienced Implementers to help with the resolutions of the Early Implementers.

Of those who were interviewed, one *obstacle* was experienced by a few teachers, student motivation. Student motivation difficulties was described by teachers in implementation years one and five (P2, P6, P10, P11). Student motivation was also seen to be an ongoing *obstacle* of a few teachers (P2, P10, P11). Whether student motivation is related to the implementation of UDL or inherent in teaching itself, is an area that needs investigating for these teachers and the district, as well as an area of future study.

The implications for districts creating curriculum with UDL is to include a variety of examples for teachers regarding student motivation techniques. If districts are committed to including UDL in their vision, then districts should encourage teachers to continue to offer multiple formats of presenting lessons and engaging students, and multiple options for students to demonstrate their knowledge. Giving students a choice empowers them to select their preferred modality of learning and ultimately increases engaged learning (Rose & Meyer, 2002), particularly if the preference is with technology (Kelley et al., 2001; Knight & Knight, 1995). Teachers should be aware that student motivation might be an inherent obstacle in teaching and classroom management and that while UDL principles assert to promote student engagement, motivating students may be an ongoing issue despite UDL implementation. Student motivation, as related to UDL, might be an area future researchers may wish to examine.

Primary Research Question: Discussion

When teachers were directly asked during the interviews, “What are your perceptions of UDL?” the responses were primarily positive with comments like, “I think good things when I think UDL” (P2, line 145), and “When we’re using UDL, we’re hitting pretty much everybody’s learning style, so it can’t help but to help everybody” (P6, lines 106-107), and “After you start using it for a while, it just becomes the way it’s done, you automatically think in that way” (P10, lines 81-82). However, there were also a few participants who felt not everyone in the district or school was “on-board” with implementing UDL or that UDL had not impacted their teaching style or vision, “I think that the classrooms are onboard, but ...our faculty meetings don’t have multiple means of

representation or multiple means or engagement, it's just you sit and you listen" (P7, lines 114-117), and "I don't think the teachers are connected into the yoke, the UDL whole concept" (P8, lines 157-158). "Pick any school in our district and you could go to one classroom and you're thinking, 'This seems to be what UDL should look like in action' and you could go next door and go, 'Ugh! This isn't very good.'" (P1, lines 65-68).

The majority of teachers interviewed responded with a positive opinion of UDL. Districts should consider that there is a possibility that when a teacher believes they have always taught *like UDL* as in this statement: "I don't know that it's [UDL] had [pause] completely had a huge impact on my teaching and the reason I say that is that I have always looked outside the box" (P3, lines 103-105). While "looking out of the box" may be considered a good quality for teachers to have, paired with the idea that P3 may relate UDL to "looking outside the box", it does not necessarily mean the teacher is implementing UDL. UDL facilitators should investigate whether UDL exists in the classroom or whether it is just effective pedagogy (King-Sears, 2009).

The survey results gave a different angle to answering the primary research question. One construct of the UDL survey focused on what respondents thought of UDL and its *affect on their teaching*. The UDL survey construct, Personal Reflections, was comprised of three survey items, (1) *I have always taught this way; UDL has not changed my lesson planning*, (2) *UDL will continue to influence my teaching*, and (3) *Compared to other educational initiatives I have experienced, I think UDL will be around for a long while*. Eighty-four percent of respondents marked that UDL had not changed their way of

teaching; that they had always taught similar to UDL. Over 87% indicated UDL will continue to influence their teaching. At first these appeared contradictory. If UDL had not changed the way they were teaching, how could it continue to influence their way of teaching? However, it could be that teachers have learned some new strategies to add to their repertoire of teaching and UDL is one.

Districts should provide professional development for teachers to discern the differences between effective teaching strategies, access to curriculum information, and how these relate to UDL. Further investigation is needed into what UDL actually looks like in the classroom; the construction and presentation of curriculum and lessons with UDL, how to engage students using UDL designed lessons, and the creation of multi-format curriculum assessments (Edyburn, 2010; King-Sears, 2009).

Previous discussion indicated most respondents felt UDL will continue to influence their teaching (see Figure 11). Question 50 showed that even though many participants felt that UDL will be around for a while, over 12% felt it would not and over 33% were unsure. Closer examination of the data of this group showed only one teacher had less than seven years of experience in education and the majority of respondents (57%) had 2-3 years experience implementing UDL. It is evident that the relationship between experience in education and UDL implementation experience needs further examination.

What is noteworthy here is that there was a significant difference in this survey construct, Personal Reflections, when analyzed using the ANOVA. There was a statistically significant difference between Early Implementers (Years 0-1) and

Experienced Implementers (Years 3+) for this construct of survey items (Tukey post hoc), which showed that the mean (M) is higher for teachers in Year 3+ of implementation, which indicates teachers experienced in implementing UDL felt more strongly that UDL influenced their teaching, that UDL will continue to influence their teaching, and that UDL will be around for a while. Part One of the study showed that teachers with more UDL experience had lower UDL operative levels. Further investigation is warranted. This district should consider examining the operative level of UDL for teachers with 7+ years teaching experience and who had been implementing UDL for 2-3 years at the time of this study. This group of teachers may need additional professional development, collaboration sessions with UDL facilitators, or networking sessions to resolve any UDL-related issues or concerns.

Turning to the CBAM Stages of Concern (see Table 7 and Figure 4) for the two groupings of teachers (Early Implementer vs Experienced Implementer), both groups had other tasks or activities that were of priority, as indicated by highest concern in Stage 0. Further examination of second highest concerns revealed that Early Implementers were also concerned with wanting more information about UDL (Stage 1), whereas the Experienced Implementers were more concerned with the management and organization of UDL (Stage 3). It could be that these two groups of teachers were not yet dissatisfied with status quo, one of Ely's conditions of change (1990). Interestingly, these were the only groups that had a 'tailing-up' in Figure 4. Tailing-up of a SoC profile in Stage 6 means that the individuals have ideas that they feel "have more merit" than UDL and sometimes the ideas are negative (George et al., 2006, p. 42). UDL facilitators or school

district administrators should err on the side of caution and strive to transform these ideas to a more positive direction. Teachers should have the opportunity to voice their concerns and ideas to UDL facilitators in a manner conducive to growth in the UDL model.

Additionally, Figure 4 revealed that teachers in year-2 and year-5+ had a *negative one-two* split (SoCQ results), when Stage 2 is higher than Stage 1. George et al., (2006) state these splits “depict individuals with various degrees of doubt and potential resistance” (p.40) to UDL. This means that the teachers in year-2 and year-5+ were more concerned about what effect UDL might have on them personally and that this concern was stronger than their desire to learn about UDL. Administrators or facilitators of UDL should attempt to reduce the concerns in Stage 2 (Personal) before there is any further training or expectations of implementing UDL, as teachers with this profile will probably resist implementing UDL for fear of losing their job or other effects on them personally (George et al., 2006).

In summary, while most teachers felt positive about implementing UDL and had many successes despite the obstacles, teachers had differing views of what UDL was supposed to look like and how UDL affected teaching and learning. Some felt UDL meant integrating technology into lessons, others felt it was good teaching strategies, and still others felt it was presenting information in different ways, but on different days. As measured by CBAM protocol SoCQ, it was evident that UDL was not a primary focus of teachers in this district, and many teachers were still unsure of how to apply UDL and how to manage and organize with UDL. Still others were concerned about how UDL would be supported. Additionally, since many teachers indicated UDL did not change the

way they taught, the question arises as to whether UDL was defined accurately enough for teachers to understand the differences between ‘good teaching’ and teaching with UDL. The next step would be to dig deeper to understand teacher perceptions of UDL and to follow the recommendations for future study, which will be discussed later.

Second Research Question - What Systemic Changes Need to Take Place in Order to Implement UDL Principles?

Systemic change typically comes from top-down models. However, models that emphasize the importance of all stakeholders have been shown to create a more positive environment and lasting change in education (Ellsworth, 2000). Another point to consider is that all stakeholders must also understand the change and what it will take to change to make the paradigm shift (Danielson et al., 2007). Evidence of ongoing support for an innovation is one of eight conditions that helps create lasting change (Ely, 1990). High-quality support for implementers must be in place and districts should focus on the issues associated with the adoption of the innovation.

The second research question, “*What systemic changes need to take place in order to implement UDL principles?*” can be answered through the discussion of the interviews and survey data results. The secondary questions to this research question will also be discussed within the context of this single discussion. The secondary questions include “*What procedural changes occur? What physical/entity changes occur? What obstacles do administrators encounter during the UDL implementation process? and What are the concerns?*” The discussion here also directly reflects the infrastructure component of systemic change presented earlier.

The most common system-wide change evident in the interviews and survey results was that a teacher's philosophy or *vision* changed and the changes made *affected teaching and learning* in their classroom to some extent (P1, P2, P3, P4, P6, P7, P9; UDL survey Q9, Q18-19). The degree to which a teacher adjusted his or her *vision* was dependent upon his or her *attitude* toward change and the level of '*buy-in*' of UDL. The SoCQ results showed that there were teachers who might be resistant to UDL or had strong ideas on how to change UDL (Figure 4). As measured by the UDL survey, many teachers did not change their ways of teaching and felt that they had always taught similar to UDL (Q48). Yet, seven of eight teachers interviewed stated that UDL had influenced their teaching to some extent, as cited above. This could be due to observer effect described earlier. However, further investigation is warranted as to the extent to which UDL affects a teacher's vision or philosophy.

Teachers will not break status quo if they do not see the need to change (Ellsworth, 2000; Ely, 1990). Therefore, if districts require teachers to implement UDL, then UDL facilitators need to find creative ways to assist teachers in seeing the need for UDL. Districts that have the goal to implement UDL systemically should be cognizant of individuals who might try to sabotage the district vision of implementing UDL and strive to redirect their efforts toward more positive changes.

An individual teacher's *vision* may have been affected by the vision of the district. The district's vision for teachers was that they were expected to implement UDL to some degree in the classroom (P1, P7, P9). Yet, the level of understanding and implementation of UDL varied throughout the district. Some of the teachers interviewed and a building

administrator felt that UDL was a tool or framework from which to work from to develop UDL lessons (P2, P3, P4, P9), but most felt UDL was a framework for planning curriculum (UDL survey Q4). Some teachers made sure the principles or *components of UDL* were included in lessons (P2, P4, P10; UDL survey Q13-15), but most did not use a UDL guide or checklist that was available to them (UDL survey Q12).

Districts should be made aware of the potential to misinterpret how UDL becomes integrated into curriculum and subsequently into the teaching and learning process. District-level follow up with building level UDL facilitators should be routine. Teachers should meet with UDL facilitators for assistance in aligning lesson plans with established curriculum and UDL checklists or guidelines. Further investigation is needed into what UDL looks like in the classroom so that teachers have a better understanding of what is expected of them (Edyburn, 2010). “A flawed process can doom the diffusion of an otherwise effective innovation” (Ellsworth, 2000, p. 30).

The infrastructure of systemic change includes support, building capacity, and having key leaders (Ellsworth, 2000). In order to build capacity, support for UDL is expected. Some participants felt the support for UDL was lacking or needed improvement, whether in administrative support or having someone in the building they could go to for assistance with UDL (P3, P8, P9; UDL survey Q25, Q30). Even though many teachers have UDL mentors in their buildings to assist them (UDL survey Q25), the percentage of respondents across the anchors for this question was almost equal. This provides even more support for the fact that there is a stronger need for support than what the district is providing teachers.

Despite the indication that professional development or trainings have helped teachers to understand UDL (Q22), many teachers still feel they need assistance with the application of UDL (see Figure 3, UDL survey Q8, ANOVA). Additionally, teachers might have been hesitant to seek help for fear of repercussions or negative effects on them personally (see Figure 4).

Districts should re-evaluate the UDL facilitator role and mentoring process for effectiveness and make adjustments accordingly. Teachers should not hesitate to seek out help from mentors or facilitators regarding the implementation of UDL if UDL is required by the district. District personnel and teachers should discuss and clarify teacher expectations regarding UDL implementation and teachers should ask for professional release time to observe mentors implementing UDL. Professional development and building capacity are “necessary for sustained implementation” (Danielson et al., 2007, p. 633).

There are no known physical changes necessary for UDL implementation, although some of the schools were updating their wiring and equipment in order to update technology.

In summary, the systemic changes that teachers perceived to have taken place were primarily in the teachers’ vision or philosophy of the teaching and learning process. The shift in vision was affected by each individual teacher’s attitude, level of ‘buy-in’ and perceived level of support at each building. The process of changing a teacher’s vision was the primary obstacle encountered by administrators and was viewed as being

an ongoing concern. There were no obvious physical changes needed for systemic change to occur.

For this participating district, getting a culture (system) to move in the same direction required *buying into* the implementation of UDL, having a *shared common language*, leadership *support*, and the resources to maintain the movement. The shared common language was centered on UDL since all initiatives fell under the UDL umbrella. Leadership support was evident through district workshops, building level meetings, and the establishment of building level UDL leadership teams. However, the perceived level of support varied from teacher to teacher and there is evidence of a need to re-examine the support structure within this district. Given the variety of opinions from staff in this district regarding the use of technology to support UDL, maintaining appropriate resources to support UDL had mixed reactions. Further investigation is needed to determine the level of technology needed to support UDL.

Limitations

There are limitations to every study and this section will detail the ones associated with this study. The first limitation and most notable is that the sample population was small, so generalizations might be questionable. There were nine participants for the observations and $N = 10$ for the interviews of Part One, but more ($N = 41$ and $N = 57$) for Part Two. The participating district was spotlighted just two months prior in a popular UDL website. The spotlight discussed perspectives of several district employees, the obstacles they encounter, and the resources and support the district provided for implementation of UDL. This may have influenced the number of people willing to

participate. The administrator interview data may not reflect accurate generalizations because of the exceptionally small number of administrator interviewees ($N = 2$). The perceptions were of those who were willing to participate and as with any individual there may be bias in responding to interview or survey questions. There is also the limitation of potential observer effect.

The district calendar may have influenced the willingness to participate. Semester exams, scheduled breaks, snow days, and having limited teacher institute days may have affected the number of participants to this study.

The UDL training format changed throughout this district's implementation cycle. Some teachers were trained by UDL experts and some were trained in UDL using the train-the-trainer model, serving as coaches or facilitators for UDL. The researcher was not aware of any fidelity measures for district training; therefore readers should consider this difference in training when reading this study.

Recommendations

Several preliminary recommendations were discussed briefly in the Findings and Implications section and will be discussed in detail here. Additional recommendations that surfaced through examination of the results will also be discussed.

The UDL survey constructs, Application of UDL, Support for UDL, and Personal Reflections, were found to be statistically significant as measured on the ANOVA and Tukey post hoc tests indicated that the significant differences appear between Early Implementers of UDL (Years 0-1) and Experienced Implementers (Years 3+). The Pearson test of correlation supports significant differences that years of experience is

related to perception of UDL and this difference should be examined further. Future research studies should investigate the changes that occur on an individual level as well as a system level from the time teachers are new to implementing UDL to three years later. A longitudinal study of UDL teacher experiences and the affect years experience in education has on the implementation of UDL is also needed. Further investigation is warranted as to how UDL might affect a teacher's philosophy. Researchers should also examine how a teacher's philosophy is established and others might investigate the university teacher training process and the extent to which UDL is embedded in the teacher training process since teacher preparatory as well as other higher education systems must include UDL ("HEOA", 2008). Teachers interviewed in this study indicated that they felt 'good' about the changes UDL has made in their teaching, primarily in helping them meet the needs of students. However, the surveys indicated high concerns and difficulty applying UDL to lessons. A more in-depth look at the concerns and other affects of UDL on teacher practices is needed.

There is also the need to investigate what UDL looks like as it is integrated into curriculum, lesson design, and lesson implementation. There is the need to develop a criteria or type of rubric that would evaluate whether UDL was being implemented or whether there was just good teaching strategies and good classroom management going on in the classroom (Edyburn, 2010). Using a CBAM IC map and the Level of Use validated interview protocol specifically created for UDL is needed to accurately define the operative levels and fidelity of UDL. While there are a number of books and articles regarding classroom management and student motivation, there is a need to investigate

how UDL influences student motivation over a period of time. Students are often motivated to learn through the use of technology or digital media (Kelley et al., 2001; Knight & Knight, 1995). Participants in this study had varying views of the role of digital media in UDL implementation. Further investigation is needed to determine the level of digital media needed to support UDL, perhaps by examining several different districts' UDL support structure.

Lasting systemic change necessitates parent and community involvement (Ellsworth, 2000). Nearly 50% of the respondents to the UDL survey indicated they have never spoken to parents about UDL. There is little known of the level of parent involvement with UDL implementation. There is the need to examine the level of parent and community involvement and the role they play in districts that have been implementing UDL for a number of years.

This study examined one district. Researchers could also explore teacher perceptions of UDL in multiple K-12 districts, complete a longitudinal study of a single district over a period of time, or focus on a single grade range, such as high school. Researchers might also consider examining the perspectives of special education teachers, bi-lingual teachers, and students. Likewise, researchers might also examine possible stereotypical perceptions amongst various groups of teachers, like new teachers versus experienced teachers, bi-lingual versus mono-lingual, or general education teachers versus special education teachers. In the end, the findings will assist in adjusting teaching practices that will ultimately benefit students and the learning environment.

While this list of recommendations is lengthy it is not exhaustive. The field of examining UDL in action is wide open for possibilities.

Conclusion

This study presented what books don't tell you, teacher perceptions of universal design for learning. This study has shown that teachers feel positive about UDL even though they are not sure how to apply UDL into the teaching and learning experience. However, this study also showed that teachers with more UDL implementation experience demonstrated lower UDL operative levels than teachers new to UDL.

UDL became policy in the IDEIA 2004, in the Higher Education Opportunity Act of 2008, and most recently, in the 2010 National Education Technology Plan. UDL "has come to dominate the field because of its broad applicability and its research foundation in the learning sciences, both cognitive and neurosciences" (U.S. Department of Education, 2010a, p. 19). At the time of this writing, there is also a proposal to include UDL within the 2011 revision of ESEA (U.S. Department of Education, 2010b).

UDL has been included in federal policy with minimal evidence-base of UDL in practice. The research basis for inclusion into policy has been in the foundational components of UDL, as described in the 2010 National Education Technology Plan: technology, current brain research and cognitive theory (U.S. Department of Education & Technology, 2010). There is a need for evidence-based research on 'what UDL looks like'.

Literature has amassed describing what UDL is, how the functional components of UDL can assist in equalizing the playing field in education, and the role of UDL in

policy (Gordon, Gravel, & Schifter, 2009), but more is needed regarding how to implement UDL, what UDL looks like, what systemic changes are needed for successful implementation, and the changes that take place in the classroom while implementing UDL. What is needed is more exploration of what books don't tell you: teacher experiences with UDL, particularly what teachers experience from first year implementation through advanced years of implementation, what UDL looks like in practice, spotlighting the exemplars of UDL with rich descriptive details, and how UDL is integrated into teaching and learning, comparing/contrasting UDL to other teaching strategies.

This study provided one district's viewpoint of UDL and may be the foundation from which others may build upon. The exploration of universal design for learning is like an untethered puppy: the investigation possibilities are boundless and there is excitement of discovery with every step. The writer encourages researchers to examine UDL and consider the possibilities.

APPENDIX A
UDL OBSERVATION CHECKLIST

UDL OBSERVATION CHECKLIST

The CAST UDL Guidelines version 1.0* and the following were used for the classroom observations:

UDL Observation Checklist	School #: _____ Teacher # _____
<i>IV. Clear, defined curriculum – focused on mastery of standards</i>	
10. Clearly articulated goals and objectives	Evidence/Artifact
10.1 Goals aligned with standards	
10.2 Goals/objectives written in measurable terms	
10.3 Scaffolds with customizable objectives for various learners	
10.4 Provides appropriate accommodations, supports, challenges	
10.5 Maintains high achievement/expectations for all	
10.6 Reduces barriers	
10.7 Students can describe intended outcome	
10.8 Students can describe expected learning objectives	
(Number of evidence/artifacts present = operative level of UDL component) 0-2 = Not yet evident 3-4 = Emerging 5-6 = Intermediate 7-8 = Advanced	(indicate level here)
11. Flexible Instructional Methods	Evidence/Artifact
11.1 Provides flexibility in presentation /accessible information	
11.2 Set high expectations	
11.3 Background information/make connections to prior learning	
11.4 Collaboration with team members	
11.5 Varying levels of challenges	
11.6 Active student involvement with options for student choices	
11.7 Digital tool use imbedded in methodology	
(Number of evidence/artifacts present = operative level of UDL component) 0-2 = Not yet evident 3-4 = Emerging 5 = Intermediate 6-7 = Advanced	(indicate level here)
2. Flexible Instructional Materials	Evidence/Artifact
12.1 Technology is available and functioning	
12.2 Curriculum presented in digital format	
12.3 Options for student feedback choice includes digital tools	
12.4 Assistive technologies where needed	
12.5 Model multiple examples	
12.6 Reduces barriers	
12.7 Model effective use of digital tools	
12.8 Students recognize appropriate digital tools for objectives	
(Number of evidence/artifacts present = operative level of UDL component) 0-2 = Not yet evident 3-4 = Emerging 5-6 = Intermediate 7-8 = Advanced	(indicate level here)

13. Standards-Based Assessments and Progress Monitoring	Evidence/Artifact
13.1 Assessments based on mastery of standard/non-competitive	
12.2 Provide multiple ways student can demonstrate success	
12.3 Provide frequent, ongoing, relevant feedback	
12.4 Students are able to monitor their own progress	
12.5 Provides feedback for future success	
(Number of evidence/artifacts present = operative level of UDL component) 0-1 = Not yet evident 2 = Emerging 3-4 = Intermediate 5 = Advanced	(indicate level here)
<i>Other info/comments</i>	

*CAST's Universal Design for Learning Guidelines (CAST, 2008)

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CAST (2008). *Universal design for learning guidelines version 1.0*. Wakefield, MA: Author

Note. UDL operative levels are based upon 25/50/75% of total for each component.

APPENDIX B
INTERVIEW QUESTIONS

Teacher and Administrator Interview Questions

Below are the interview questions that guided the teacher and administrator interviews.

Teacher questions:

1. What concerns do you have during the implementation of UDL?
2. How has UDL affected your lesson planning or activity planning?
3. How has UDL affected how you present lessons or activities?
4. How has UDL affected how students are engaged with the lessons or activities?
5. What successes and/or obstacles have you encountered during the implementation of UDL?
6. What changes have you seen (that have taken place) during the implementation of UDL?
7. What are your personal perceptions of UDL?
8. Looking at the 'big picture' – how are things going for you right now?

Administrator questions:

1. Will you please describe any specific procedural, physical, or systemic changes that were required of administration before and during the implementation of UDL?
2. Describe and any concerns you encountered during the UDL implementation process
3. What do you feel teachers are doing (or should be doing) in order to implement UDL?

APPENDIX C
SURVEY

Section One: Survey of Concerns Questionnaire (SoCQ)

Copyright © by SEDL and can be found in the following:

George, A. A., Hall, G. E., & Stiegelbauer, S. M. (2006). *Measuring implementation in schools: The stages of concern questionnaire*. Austin, TX: SEDL.

Section Two: UDL Survey

Read each statement. Indicate the number that best represents how you feel right now. Use the scale below as a guide for your responses.

0	1 2	3 4 5	6 7
Not relevant	Not true of me now	Somewhat true of me now	Very true of me now

A. General Understanding of UDL	
1. I understand what UDL is.	0 1 2 3 4 5 6 7
2. I have enough knowledge of UDL to integrate its principles into my lesson planning.	0 1 2 3 4 5 6 7
3. I need more or ongoing professional development in UDL.	0 1 2 3 4 5 6 7
4. I understand that UDL is a framework for planning curriculum that addresses the diverse needs of students in my classroom.	0 1 2 3 4 5 6 7
5. I know that UDL is a change from focusing on individual students to focusing on a curriculum that needs to be designed to meet the needs of all students.	0 1 2 3 4 5 6 7
6. I understand that using technology is not UDL. Rather, it is the digital media that makes it easier to have flexible curriculum that can be easily transformed to meet the needs of all learners.	0 1 2 3 4 5 6 7
7. I understand the goal of applying UDL to lesson planning is to minimize learning barriers and to maximize learning opportunities for all students.	0 1 2 3 4 5 6 7
B. Application of UDL	
8. I would like to know how to present my (UDL) lessons in my classroom.	0 1 2 3 4 5 6 7
10. I often give students the choice of how they want to demonstrate what they know.	0 1 2 3 4 5 6 7

11. I present curriculum information to students in a variety of ways.	0	1	2	3	4	5	6	7
12. In planning lessons, I refer to the UDL guidelines checklist.	0	1	2	3	4	5	6	7
13. In planning lessons, I provide multiple means of representation (e.g., presenting lessons/curriculum in a variety of formats and styles).	0	1	2	3	4	5	6	7
14. In planning lessons, I provide multiple means of action and expression.	0	1	2	3	4	5	6	7
15. In planning lessons, I provide multiple means of engagement.	0	1	2	3	4	5	6	7
16. I plan lessons in collaboration with special education teachers, focusing on curriculum goals.	0	1	2	3	4	5	6	7
17. I understand that curriculum is defined as goals, methods, and assessments and that UDL is a critical element of each of these curriculum components.	0	1	2	3	4	5	6	7
18. UDL will continue to influence my daily decision-making during the teaching and learning process.	0	1	2	3	4	5	6	7
19. UDL will continue to influence my lesson planning.	0	1	2	3	4	5	6	7
20. I include the use of technology in my lesson planning.	0	1	2	3	4	5	6	7
21. I include the student use of technology in the teaching and learning process.	0	1	2	3	4	5	6	7
C. UDL Professional Development								
22. The UDL training (professional development) helped me to understand and implement UDL into the teaching process.	0	1	2	3	4	5	6	7
23. I would like to see one annual 'refresher' UDL training (professional development).	0	1	2	3	4	5	6	7
24. I would like to see ongoing or multiple 'refresher' UDL trainings (professional development).	0	1	2	3	4	5	6	7
D. Support for UDL								
25. I have a mentor or someone I can collaborate/consult with regarding UDL.	0	1	2	3	4	5	6	7

26. I am a UDL mentor or a 'go-to' person for others in the building.	0 1 2 3 4 5 6 7
27. I can find someone in the building to help me with a technology problem I cannot resolve.	0 1 2 3 4 5 6 7
28. I have time in my daily schedule to collaborate with colleagues regarding UDL	0 1 2 3 4 5 6 7
29. I have time in my weekly schedule to collaborate with colleagues regarding UDL.	0 1 2 3 4 5 6 7
30. I know that if I need help regarding integrating UDL into the teaching and learning process, my administrator, team leader, or UDL leader will help me.	0 1 2 3 4 5 6 7
31. My administrator arranges teacher plan time or schedules special time so that I can collaborate with colleagues around UDL lesson planning.	0 1 2 3 4 5 6 7
32. I am comfortable with using the computer or other technology for teaching.	0 1 2 3 4 5 6 7
33. Students have access to technology in my classroom.	0 1 2 3 4 5 6 7
34. I can show students how to access curriculum information using technology.	0 1 2 3 4 5 6 7
E. Impact of UDL	
35. I have struggling students who have made greater achievement gains since I have integrated UDL principles into the teaching and learning process.	0 1 2 3 4 5 6 7
36. I hope UDL will remain an integral part of the teaching and learning process in my building.	0 1 2 3 4 5 6 7
37. I have noticed that more students are actively participating in the learning process.	0 1 2 3 4 5 6 7
38. I have heard parents commenting on UDL.	0 1 2 3 4 5 6 7
39. I have heard discussions of or been a part of UDL in the teachers' lounge/cafeteria or other informal meetings.	0 1 2 3 4 5 6 7

40. I have spoken to parents about UDL.	0 1 2 3 4 5 6 7
41. I have had some success stories since I have implemented UDL	0 1 2 3 4 5 6 7
42. I have run into some obstacles since I have implemented UDL.	0 1 2 3 4 5 6 7
F. Planning for Individual Students	
43. I make accommodations for individual students.	0 1 2 3 4 5 6 7
44. When I create a lesson or unit, I write down ways to help the struggling students.	0 1 2 3 4 5 6 7
45. I am aware of specific needs of students.	0 1 2 3 4 5 6 7
46. I know that my classroom has a wide range of student needs, preferences, and abilities, etc., and that no single solution will work for all.	0 1 2 3 4 5 6 7
47. I know that making accommodations for individual students may benefit other students.	0 1 2 3 4 5 6 7
G. Personal Reflection	
48. I have always taught this way (similar to the principles of UDL); UDL has not changed my lesson planning.	0 1 2 3 4 5 6 7
49. UDL will continue to influence my teaching.	0 1 2 3 4 5 6 7
50. Compared to other education initiatives I have experienced, I think UDL will be around for a long while.	0 1 2 3 4 5 6 7

51. If you were observed and/or interviewed as aprt of this study, you may enter the number given to you below ____.

52. I been involved with UDL activities for ____ years, not counting the 2009-10 school year?

Never ____ **1 year** ____ **2 years** ____ **3 years** ____ **4 years** ____ **5 or more years** ____

53. In regards to -UDL, I consider myself to be a:

Non-user ____ **novice** ____ **intermediate** ____ **old hand** ____ **past user** ____

54. I have participated in _____ (number) formal training(s) regarding the innovation (UDL) like workshops, seminars, courses?

55. My primary role is: **teacher** ___ **administrator** ___ **other (list)** _____

56. I have _____ **years experience** in education.

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VITA

MaryLou (Kuban) Hatley graduated from National College of Education in 1983 with a bachelor's degree and double majors of Elementary Education and Psychology, a minor in Math and is certificated in Elementary Education, Learning Disabilities (LD), Behavior Disorder (BD) and Educably Mentally Handicapped (EMH). In 2001, she received her M.Ed from National-Louis University. In 2002, she received an Assistive Technology certificate from California State University at Northridge. MaryLou received her doctoral degree in Education through Loyola University Chicago in 2011.

MaryLou began her career in 1984 as a Chapter One/Title One teacher. She taught K-12+ for 18 years in the field of special education, working with students with disabilities including those with LD, BD, EMH, ED, PI, HI, VI, TBI, and Autism. During the 18 years, she taught Instructional level, Resource level, REI, and co-taught high school English. During this time she was instrumental in training staff in T.E.S.A., Cooperative Learning, co-teaching strategies, and assistive technology. She also implemented a school-wide behavior intervention plan, earned certifications for handling authentic NASA moon rocks and STARLAB portable planetariums. Her students won the national award for Child's Play, a traveling theater that performs student-written stories and poems. She has been working as an Assistive Technology (A.T.) Specialist for a local school district since 2001. She established the policy and procedures for the current A.T. department. Her primary responsibilities are in the evaluation of students for their

assistive technology needs, the acquisition and maintenance of the district A.T. inventory of over 2300 items, and the training of students, staff and parents with the assistive technology.

MaryLou presents professional development workshops annually and has presented break-out sessions, both at local conferences and international conferences. She was part of a team that provided professional development to implement K-5 Balanced Literacy support tools to include Inspiration®, Kidspiration®, KidPix®, and WiggleWorks®. She acquired a grant for a district-wide accessibility suite of software and continues to offer trainings for the software. She recently presented data results of a pilot study, the district-wide implementation of a software application to support children with reading disabilities. She most recently obtained a state grant through Recording for the Blind and Dyslexic to supply digital media and equipment for eight district schools.

MaryLou, as a member of the Building Leadership Team, was instrumental in writing a building action plan 1987-1991 and sat as Co-Chair in a district Strategic Planning Committee in 1992-1993. MaryLou also earned Teacher of the Year award in 1998. She is former member in Council for Exceptional Children/Technology and Media Division. She is an active member of two subject area committees (SAC) in the restructuring of district-wide curriculum, sits on the district Curriculum Counsel Committee, which oversees all SACs, and has most recently been accepted as a member to the District Diversity/Equity Action Team.

DISSERTATION COMMITTEE

The Dissertation submitted by MaryLou Hatley has been read and approved by the following committee:

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