Implementing the Unified English Braille Code: Perspectives of teachers of students with visual impairments

Laura Leigh Bostick
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IMPLEMENTING THE UNIFIED ENGLISH BRAILLE CODE:

PERSPECTIVES OF TEACHERS OF STUDENTS WITH

VISUAL IMPAIRMENTS

by

Laura Leigh Bostick, B.S., M.A.Ed.

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

COLLEGE OF EDUCATION
LOUISIANA TECH UNIVERSITY

May 2016
March 24, 2016

We hereby recommend that the dissertation prepared under our supervision by Laura Bostick entitled "Implementing the Unified English Braille Code: Perspectives of Teachers of Students with Visual Impairments" be accepted in partial fulfillment of the requirements for the Degree of Doctor of Education, Educational Leadership.

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Dean of the Graduate School

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ABSTRACT

With change process theory as a framework, the researcher used the diagnostic tools of the Concerns-Based Adoption Model to investigate both the concerns and behaviors of teachers of students with visual impairments (TVIs) during the transition to Unified English Braille (UEB). Quantitative data from the Stages of Concern Questionnaire and qualitative data from Open-Ended Concerns Statements and Levels of Use interview transcripts were consolidated to address the research questions: (1) What are TVIs' attitudes and beliefs toward the transition to UEB? and (2) To what extent are TVIs currently using UEB?

Participants were limited to TVIs in one southern state. Thirty-four TVIs responded to the survey, and 12 of the respondents participated in focused interviews. The following conclusions were drawn from the findings:

- At this point in the implementation process, many TVIs, even those with experience using UEB, have unresolved self concerns about the transition. This may indicate inadequate or ineffective training and support.

- TVIs have unusually high Collaboration concerns in relation to their other concerns, and a progression to more intense Collaboration concerns with increasing experience with UEB.

- TVIs who designated themselves non-users of UEB appear to be negative about the transition. The subgroup profile has strong indicators of possible resistance.

- The TVIs who participated in interviews had slightly higher Levels of Use of UEB than predicted for first-year users of an innovation; however, there is some indication that use is “running ahead” of concerns (i.e., TVIs still have intense self concerns that have not been resolved).
The key concerns expressed by the TVIs included: the need for training on both changes in braille code and instructional strategies for teaching UEB; which code(s) will be used for mathematical and science notation; the TVIs' own abilities to learn and teach UEB; the time required to learn and teach the new code; the availability of resources in UEB; and how UEB may impact their students.

The diagnostic data gathered in this study may be used in a prescriptive manner to design interventions to support TVIs and ensure a successful implementation process. Recommendations for interventions based on the findings are provided.
APPROVAL FOR SCHOLARLY DISSEMINATION

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Author  Sama L. Bertie

Date  4/27/16
DEDICATION

I gratefully dedicate this dissertation to four individuals who have encouraged and supported me every step of the way. This accomplishment would not have been possible without them. I love each of them more than I can say.

To my parents, Bob and Anne Bostick, it is your belief in the value of education and your unwavering support of me and my ever-changing dreams that gave me the strength and determination to do this. Thank you for your guidance, your help, and your frozen casseroles that kept us fed.

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To my daughter, Lindsay, you are the reason I am here today. You inspire me and challenge me, and being your mother has made me a better person. I will be forever grateful. You make it all worthwhile, and I am so very proud of you.
# TABLE OF CONTENTS

Abstract ....................................................................................................................................................... iii

Dedication ................................................................................................................................................... vi

List of Tables ........................................................................................................................................... xiii

List of Figures .......................................................................................................................................... xiv

Acknowledgments .................................................................................................................................... xv

Chapter 1: Introduction ......................................................................................................................... 1

  Background ........................................................................................................................................... 2

  Motivation for and Creation of a Unified Code ................................................................................. 2

  Unified English Braille (UEB) and Its Adoption in the U. S. ......................................................... 5

Statement of the Problem ...................................................................................................................... 6

Purpose of the Study ............................................................................................................................... 8

Research Questions ............................................................................................................................... 8

Theoretical Framework .......................................................................................................................... 8

Significance of the Study ....................................................................................................................... 12

Assumptions ......................................................................................................................................... 14

Limitations ........................................................................................................................................... 15

Delimitations ....................................................................................................................................... 15

Definition of Terms ............................................................................................................................... 15
Acronyms .....................................................................................................................................17
Outline of the Study ....................................................................................................................18
Chapter 2: Review of the Literature ..........................................................................................19
  Research-to-Date on Unified English Braille (UEB) ............................................................19
    Studies on Perceptions of the Code .............................................................................20
    Studies on Physical Attributes of the Code ..............................................................22
    Studies on Readability of the Code .............................................................................24
    Implementation Studies and Reports ...........................................................................26
    Summary of UEB Research .........................................................................................30
Change Process Theory ............................................................................................................31
  Focus on the Innovation ................................................................................................32
  Focus on the Change Environment ................................................................................33
  Focus on the Change Agent ..........................................................................................34
  Focus on the Change Process .......................................................................................35
  Focus on Resistance to Change ..................................................................................36
  Focus on the Intended Adopter ...................................................................................37
  Summary of Change Process Theory ........................................................................38
Concerns-Based Adoption Model (CBAM) ..........................................................................39
  Stages of Concern ........................................................................................................40
  Levels of Use ................................................................................................................45
  Interventions ................................................................................................................48
  CBAM in Research .......................................................................................................48
Conclusion .................................................................................................................................50
Chapter 3: Methodology .........................................................................................................................52

Population and Participants ..................................................................................................................53

Instrumentation ......................................................................................................................................54

Stages of Concern (SoC) ......................................................................................................................54

Levels of Use (LoU) .............................................................................................................................55

Data Collection Procedure .................................................................................................................57

Ethical Considerations ........................................................................................................................59

Trustworthiness ......................................................................................................................................59

Data Analysis Procedure .....................................................................................................................61

SoCQ .....................................................................................................................................................61

Open-Ended Concerns Statements .....................................................................................................63

LoU Interviews ....................................................................................................................................63

Thematic Analysis ................................................................................................................................63

Summary ...............................................................................................................................................64

Chapter 4: Results and Analysis ..........................................................................................................65

Demographic Data ................................................................................................................................66

Findings: Research Question 1–Stages of Concern ..............................................................................71

SoCQ .....................................................................................................................................................71

Profile Interpretation ............................................................................................................................72

Peak Stage Score Interpretation ............................................................................................................73

First and Second High Stage Score Interpretation ................................................................................74

Individual Item Analyses .....................................................................................................................75

Subgroup Analyses ...............................................................................................................................76
Open-Ended Concerns Statements ........................................................................................................79

Findings: Research Question 2—Levels of Use ..........................................................................................80

LoU Interviews .......................................................................................................................................80

Profiles of TVIs .........................................................................................................................................85

Amy ..........................................................................................................................................................85

April ..........................................................................................................................................................88

Beth ..........................................................................................................................................................91

Carol ..........................................................................................................................................................94

Karen ..........................................................................................................................................................96

Lola ............................................................................................................................................................99

Michelle ......................................................................................................................................................102

Natasha ......................................................................................................................................................104

Shelly .........................................................................................................................................................107

Stone ..........................................................................................................................................................109

Sunny ..........................................................................................................................................................112

Tracy ...........................................................................................................................................................114

Thematic Analysis .....................................................................................................................................117

Concerns About UEB and the Transition .................................................................................................117

Unconcerned ..............................................................................................................................................118

Informational Concerns ............................................................................................................................118

Personal Concerns ......................................................................................................................................120

Management Concerns .............................................................................................................................120

Consequence Concerns .............................................................................................................................121
## Perceived Obstacles to the Transition

- Training ................................................................. 122
- Math ................................................................. 122
- Materials ......................................................... 123
- Attitudes ......................................................... 123
- Assessments ................................................... 124

## Status of UEB Implementation

- Teaching UEB .................................................. 125
- Attitudes and Opinions About UEB .................. 126
- The TVI Profession ........................................... 128

## Chapter 5: Summary, Conclusions, Discussion, and Recommendations

- Summary .......................................................... 130
- Research Question 1: Stages of Concern ............ 131
- Research Question 2: Levels of Use .................. 132
- Conclusions .................................................... 133
- Discussion ....................................................... 133
- Participants ..................................................... 134
- Innovation ...................................................... 135
- Stages of Concern ........................................... 137
- Levels of Use .................................................. 142
- Thematic Analysis ............................................ 144
- Recommendations ........................................ 146
Recommendations for Practice .................................................................146
Recommendations for Further Study .........................................................147

Appendix A: Overview of Braille .................................................................150
   Reading Braille .....................................................................................151
   The Importance of Braille .................................................................153

Appendix B: UEB Timeline .................................................................156

Appendix C: UEB Research Studies .........................................................158

Appendix D: SoCQ Online .................................................................162

Appendix E: Format of the LoU Branching Interview .........................171

Appendix F: LoU Basic Interview Protocol .............................................173

Appendix G: Human Use Committee Approval .......................................178

Appendix H: Request for Participation and Reminder Emails ..............183

Appendix I: SoCQ Quick Scoring Device ..............................................188

Appendix J: LoU Interview Rating Sheet ..............................................192

Appendix K: LoU of the Innovation Chart ..........................................194

Appendix L: Open-Ended Concerns Statements ....................................197

Appendix M: Concerns and the Facilitation of Change .........................201

References .............................................................................................205
LIST OF TABLES

Table 1. Typical Expressions of Concern about the Innovation ...................................................10
Table 2. Levels of Use Typical Behaviors ......................................................................................11
Table 3. Stages of Concern about the Innovation: Paragraph Definitions ....................................41
Table 4. Levels of Use of the Innovation ......................................................................................46
Table 5. UEB-Specific Probing Interview Questions .....................................................................56
Table 6. SoCQ Respondents’ Demographic Data and Peak Stages of Concern ...........................67
Table 7. Frequency of Highest Concerns Stage ............................................................................73
Table 8. First and Second High Stage Score Distribution .............................................................74
Table 9. Individual Items Raw Scores ............................................................................................75
Table 10. LoU Participants’ Data ..................................................................................................82
Table 11. Frequency of Level of Use ............................................................................................83
Table 12. Frequency of Highest Concerns Stage ...........................................................................83
Table 13. Listing of Individual Stages of Concern Percentile Scores ............................................84
LIST OF FIGURES

Figure 1. Hypothesized Development of Concerns .................................................................42
Figure 2. Group Concerns Profile: All Survey Respondents (34) .............................................72
Figure 3. Profile Comparison: Non-User vs. User ..................................................................78
Figure 4. Profile Comparison: No Training vs. Training ..........................................................78
Figure 5. Amy’s Concerns Profile ............................................................................................86
Figure 6. April’s Concerns Profile ............................................................................................89
Figure 7. Beth’s Concerns Profile ............................................................................................91
Figure 8. Carol’s Concerns Profile ...........................................................................................94
Figure 9. Karen’s Concerns Profile .........................................................................................97
Figure 10. Lola’s Concerns Profile ..........................................................................................100
Figure 11. Michelle’s Concerns Profile ..................................................................................102
Figure 12. Natasha’s Concerns Profile ....................................................................................105
Figure 13. Shelly’s Concerns Profile ......................................................................................107
Figure 14. Stone’s Concerns Profile .......................................................................................110
Figure 15. Sunny’s Concerns Profile ......................................................................................113
Figure 16. Tracy’s Concerns Profile .......................................................................................115
Figure 17. Concerns Comparison: Typical Non-User vs. TVIs .................................................138
Figure 18. TVIs’ Concerns Profiles by User Status .................................................................140
Figure 19. Hypothesized Development of Concerns ..............................................................140
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CHAPTER 1

INTRODUCTION

In November 2012, the Braille Authority of North America (BANA) voted to adopt a new braille code—Unified English Braille (UEB)—for use in the United States. On January 4, 2016, the 207th birthday of Louis Braille, UEB officially replaced the English Braille American Edition code (BANA, 2012, 2013a). The adoption was recognized by the Director of the National Library Service for the Blind and Physically Handicapped as “the first extensive change to the English braille code, a major literary tool, since the 1930s” (Library of Congress, 2015, para. 2). A change of this magnitude affects many stakeholders and will take a number of years to implement fully. It will require extensive retraining of all current braille readers, teachers of students with visual impairments (TVIs), paraprofessionals serving students with visual impairments, rehabilitation specialists, and braille transcribers. The change also will require the development of new learning materials and instructional strategies, and the replacement of reference and support materials. Assistive technology equipment and braille transcription software will require updates. Educational organizations will need to determine which code(s) will be used for high-stakes assessments during the transition period (BANA, n.d.; D’Andrea, 2015b; McLennan, 2015).

BANA (2014) has encouraged each state to develop its own implementation plan for UEB, addressing the unique needs of the state, including how
educational and assessment materials are procured and the resources available to make the transition to UEB. Each plan also must address the state’s timeline for how/when all TVIs, paraprofessionals, and transcribers will be trained on the new code; how/when students at different levels (both new readers and those already proficient in the current braille code) will be taught the new code; how long materials will be produced in both codes; which code will be used for standardized testing during the transition; and whether the UEB code will be used for braille math and science notation (D’Andrea, 2015b; McLennan, 2015).

**Background**

For readers unfamiliar with braille and its importance in the education of students with visual impairments, Appendix A provides a brief overview. The following paragraphs explain both the historical context for the change in the braille code and what the change itself entails.

**Motivation for and Creation of a Unified Code**

Beginning in the late 1980s, concern was expressed over the number of braille codes and symbols used in the United States (D’Andrea, 2015b). In addition to the *English Braille American Edition* literary code, the United States used specialized braille codes for some subjects, such as the *Nemeth Code of Braille Mathematics and Science Notation* and the *Computer Braille Code*. In 1991, Dr. Tim Cranmer and Dr. Abraham Nemeth, each a braille reader and code developer, wrote to BANA regarding the “vital issue of a uniform Braille code” (Cranmer & Nemeth, 1991, para. 1). They suggested the proliferation of braille codes and the attendant conflicts among those codes with regard to symbols and rules were partly to blame for the steady decline in braille usage. Multiple
codes meant there could be multiple braille symbols representing a single print symbol. For example, the dollar sign, the percent sign, and the sign for square brackets each had one representation in the literary code, another in the *Nemeth Code of Braille Mathematics and Science Notation*, and still another in the *Computer Braille Code*. This complexity required extensive training for teachers, transcribers, and braille readers to learn all the codes. A uniform code would mean braille readers need only learn one code, alleviating the "complexity and disarray" of the multiple codes (Cranmer & Nemeth, 1991, para. 2).

Their memo went on to explain how having multiple braille symbols represent a single print symbol caused problems in the computer translation of print to braille and backtranslation of braille to print. For the same reason the multiple braille codes had become confusing to readers and transcribers, braille translation software could not always determine the meaning of a symbol that could mean different things in different codes, nor could it shift between codes mid-document without the intervention of a transcriber. A uniform code would improve the accuracy of computer translation and would require less human interaction.

They suggested a uniform code could include new symbols that would give the braille reader the same information as provided to print readers. For example, although print has several font attributes that show emphasis (e.g., bold, underline, italics), the literary braille code at the time had only one symbol to indicate emphasis of any kind. Similarly, the literary braille code had only one way to show an accent mark, while print has many (i.e., acute, umlaut, grave, cedilla, tilde) (BANA, 2013b).
Based on the recommendations in the Nemeth/Cranmer memorandum, BANA began a research project to investigate the creation of a unified code (BANA, 2012). In 1993, the project was adopted by the full International Council on English Braille (ICEB), and the scope was expanded to address not just the braille codes in the United States, but the differing codes, both literary and technical, used in other English-speaking countries. The goal was to create one international English braille code that contained both literary and technical symbols, lessened ambiguity, gave the braille reader the same information provided to print readers, and allowed for faster and more accurate translation and backtranslation (Bogart & Koenig, 2005; D’Andrea, 2015b).

ICEB’s UEB team took all these factors into consideration, and after years of analysis, research, and debate, ICEB declared UEB to be sufficiently complete for recognition as an international standard on April 2, 2004. The president of ICEB announced:

This is a historic day for equitable access to literacy by blind people in both developed and developing countries. We want to make Braille more accessible for students, leisure readers and professionals: easier to learn, cheaper to produce, convenient to teach and more plentiful. (ICEB, 2004, para. 3)

Individual countries began adopting the code immediately. Since that time, all the English-speaking nations that make up ICEB have adopted UEB. The United States was the last to adopt the code, in November of 2012, and was the only country that elected to maintain a separate code for math and science notation (BANA, 2012). Appendix B contains a detailed timeline of the efforts to unify the braille code and the subsequent adoption of UEB in the ICEB countries: Australia, Canada, Ireland, New Zealand, Nigeria, South Africa, the United Kingdom, and the United States.
Unified English Braille (UEB) and Its Adoption in the U. S.

UEB is based on the literary code and was designed to be easily readable by current users of that code (Bogart & Koenig, 2005; D’Andrea, 2015b; Steinman, Kimbrough, Johnson, & LeJeune, 2004). The dot formations of letters and numbers in the literary code stayed the same. The following is a brief summary of the major similarities and differences between UEB and *English Braille American Edition*:

- No new contractions were added, but nine were deleted to reduce ambiguity.
- Some of the rules for the use of contractions changed—contractions generally can be used more often in UEB.
- The practice of writing some words unspaced from others was discontinued.
- Some punctuation changed, as did some symbols such as the asterisk, percent sign, dollar sign, and degree sign.
- The methods for adding emphasis changed to allow a braille reader to have the same information as a print reader (e.g., whether a word is in italics or underlined).
- Most basic formatting rules stayed the same.
- Because UEB is a complete code containing both literary and technical symbols, it is not necessary to switch codes to show operational symbols or to write web and email addresses.

While UEB was designed to be easily readable by current users of the literary code, extensive changes to the technical codes were required to create a unified code. For this reason, current users of the technical codes may be affected most by the transition to UEB (Gerber & Smith, 2006; Wetzel & Knowlton, 2006a).

The issue of changes to the technical codes is further complicated by the manner in which BANA chose to adopt UEB. While all other English-speaking countries adopted UEB as a replacement for the current literary and technical codes, BANA chose to
maintain the *Nemeth Code of Braille Mathematics and Science Notation* in the United States (BANA, 2012). This unorthodox adoption has created confusion as to which code or codes for mathematics and science notation should be taught in teacher preparation programs and in K-12. At this time, there is discrepancy between states regarding which code will be used for mathematical and science notation—some state implementation plans indicate UEB will be used in all applications, others indicate UEB will be used in literary contexts and the *Nemeth Code of Braille Mathematics and Science Notation* will be used for math and science notation, and still others plan to decide which code to use for math and science notation based on individual students’ needs (D’Andrea, 2015b). Even the Board of BANA recognizes the dilemma and is split on which code should be used for technical materials. In a press release dated November 18, 2015, BANA issued the following statement regarding braille math and technical materials as it relates to the adoption of UEB in the United States:

The Braille Authority of North America (BANA) recognizes and appreciates the genuine concerns from the braille community regarding the transition to Unified English Braille (UEB)....The Board of BANA could not reach consensus regarding the establishment of a single standard code for technical materials for braille in the United States. The decision to use UEB or the Nemeth Code within UEB context for technical materials should be made based on braille readers’ individual needs. (para. 4)

**Statement of the Problem**

BANA (2013a) declared January 4, 2016 as “the date by which the United States will implement the general use of Unified English Braille (UEB)” (para. 1); however, states are at different levels of readiness to make the transition, and the current state of implementation for the country as a whole is unclear. States have noted several unresolved issues that may be limiting the speed and quality of implementation.
D’Andrea (2015b) reported that, in late 2014, BANA in coordination with the Council of Chief State School Officers (CCSSO), distributed a survey to assessment directors in all 50 states to gather information about each state’s readiness to transition to UEB. Survey participants identified as key issues: concerns about the code itself (particularly regarding its use in technical applications), assessment procedures and practices, production of instructional materials in UEB, training of transcribers and teachers in the new code, and financial considerations.

In addition to the many logistical issues raised by the transition to UEB, the human element of the transition to a new braille code must be considered. In considering the impact of adopting UEB, BANA (n.d.) noted that the psychological and emotional impact on braille users could not be determined in advance. Research conducted in the years leading up to UEB adoption revealed views regarding the transition to braille were often emotional and impassioned, reflecting the investment people had made in learning braille and their concern regarding the personal impact of the change (Cryer, Home, & Osborne, 2011). Gerber and Smith (2006) discovered TVIs were especially concerned with how their students would adapt, concluding, “Overwhelmingly and universally, the greatest concerns of all teachers involved students making the transition from existing codes to UEB” (p. 465).

The Concerns-Based Adoption Model, which provided the theoretical framework for this study, is based on the idea that the single most important factor in any change process is the people who will be most affected by the change (Hall & Hord, 2015; Hall, Wallace, & Dossett, 1973; Hord, Rutherford, Huling, & Hall, 2006). As plans are developed and implementation efforts begin, it is critical to consider the concerns and
readiness of the frontline users in the education system—TVIs and students with visual impairments. More information is needed to determine how much TVIs know about UEB, how they are dealing with the transition, what their concerns are, and what kinds of support they may need (D’Andrea, Wormsley, & Savaiano, 2014; ICEB, 2008).

Purpose of the Study

The purpose of this study was to provide a comprehensive description of TVIs’ concerns about implementing UEB and the levels at which they are currently using UEB through the use of the research-based Stages of Concern and Levels of Use diagnostic tools of the Concerns-Based Adoption Model of educational change.

Research Questions

This study aimed to investigate both the concerns and behaviors of TVIs during this transition period to UEB. The research questions that guided this study were:

1. What are TVIs’ attitudes and beliefs toward the transition to UEB?
2. To what extent are TVIs currently using UEB?

Theoretical Framework

The researcher examined the transition to UEB through the lens of change theory. Change theory posits that change is a process, and understanding the process is crucial when adopting and implementing an educational innovation. Fullan (2007) described the change process in terms of phases: the adoption phase, the implementation phase, and the continuation phase. Rogers (1995) stated that change, or “diffusion,” occurs over time and consists of a series of actions and decisions that occur sequentially in five stages: knowledge, persuasion, decision, implementation, and confirmation. Hall and Hord
(2015) define change as "a process through which people and organizations move as they gradually learn, come to understand, and become skilled and competent in the use of new ways" (p. 11). Though these and other change theorists vary in their focus, they all describe change as a process, not an event, and their models provide a framework for successfully managing change.

The Concerns-Based Adoption Model (CBAM), first introduced by Hall, Wallace, and Dossett in 1973, is a research-based framework for understanding the personal side of the change process (Hord, 1981; Hord et al., 2006). CBAM is based on the understanding that change is accomplished by individuals, and is a highly personal experience that takes time and involves developmental growth in feelings and skills (Hall & Hord, 2015; Hall et al., 1973; Hord et al., 2006). As they implement an innovation, individuals’ concerns about and use of the innovation will progress through a series of definable, predictable, and measurable stages and levels.

The first dimension of CBAM, Stages of Concern (SoC), addresses the affective side of change—people’s reactions to, feelings about, perceptions of, and attitudes toward an innovation. SoC is based on the idea that for a new program to succeed, it is critical to understand and address the concerns of the people charged with implementing it (Hall & Hord, 2015). Research suggests that, as a change process unfolds, individuals’ feelings and perceptions evolve through four levels: Unrelated concerns (individual is not concerned about the innovation), Self concerns (individual is looking for more information about the innovation or is concerned about how the innovation will affect him or her personally), Task concerns (individual is concerned about the details of implementing the innovation), and Impact concerns (individual is concerned about: how
the innovation will affect students, collaborating with other teachers, or improving the innovation) (Hall & Hord, 2015; Hall & Loucks, 1978; Hall & Rutherford, 1976). These levels can be further sub-categorized into seven stages. The stages, along with typical expressions of concern that might be expressed by individuals at each stage, are presented in Table 1.

Table 1. Typical Expressions of Concern about the Innovation

<table>
<thead>
<tr>
<th>Levels of Concern</th>
<th>Stages of Concern</th>
<th>Expressions of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact 6 Refocusing</td>
<td>How can I relate what I am doing to what others are doing?</td>
<td></td>
</tr>
<tr>
<td>5 Collaboration</td>
<td>How is my use affecting learners? How can I refine it to have more impact?</td>
<td></td>
</tr>
<tr>
<td>4 Consequence</td>
<td>I seem to be spending all my time getting materials ready.</td>
<td></td>
</tr>
<tr>
<td>Task 3 Management</td>
<td>How will using it affect me?</td>
<td></td>
</tr>
<tr>
<td>Self 2 Personal</td>
<td>I would like to know more about it.</td>
<td></td>
</tr>
<tr>
<td>Unrelated 0 Unconcerned</td>
<td>I am not concerned about it.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Hall & Hord, 2015, p. 85

While SoC focuses on attitudes and feelings, the second dimension of CBAM, Levels of Use (LoU), focuses on behaviors—how much and how well those implementing the change are currently using an innovation (Hall & Hord, 2015; Hord et al., 2006). When evaluating the implementation and effectiveness of an innovation, it is important to know how the innovation is being used.
Hord et al. (2006) explain:

In school after school where changes have been introduced, research shows that there are people who do not use the innovation at all, even months or years after the introduction. There are others who use only parts of an innovation, while still others try to use it but struggle. (p. 54)

The LoU construct describes the behaviors of the users of an innovation through various levels, ranging from nonuse to advanced use, as they acquire new skills and vary their use of the innovation (Hall & Hord, 2015; Loucks, Rutherford, & Newlove, 1975). Typical behaviors demonstrated in the eight distinct levels of use are shown in Table 2.

Table 2. Levels of Use Typical Behaviors

<table>
<thead>
<tr>
<th>Levels of Use</th>
<th>Behaviors Associated with the LoU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level VI: Renewal</td>
<td>Explores major modifications or alternatives to current innovation</td>
</tr>
<tr>
<td>Level V: Integration</td>
<td>Coordinates innovation with other users for increased student impact</td>
</tr>
<tr>
<td>Level IVB: Refinement</td>
<td>Makes changes to increase student outcomes, based on assessment</td>
</tr>
<tr>
<td>Level IVA: Routine Use</td>
<td>Makes few or no changes to an established pattern of use</td>
</tr>
<tr>
<td>Level III: Mechanical Use</td>
<td>Makes changes to better organize use</td>
</tr>
<tr>
<td>Level II: Preparation</td>
<td>Prepares to begin use of the innovation</td>
</tr>
<tr>
<td>Level I: Orientation</td>
<td>Seeks information about the innovation</td>
</tr>
<tr>
<td>Level 0: Nonuse</td>
<td>Shows no interest in the innovation; takes no action</td>
</tr>
</tbody>
</table>

Source: Hord & Roussin, 2013, p. 121
The diagnostic components of CBAM, SoC and LoU, provide a snapshot of individuals before, during, or after implementation of an innovation, and taken as a whole, can provide evidence of the current extent and quality of the implementation. The prescriptive component of CBAM suggests actions based on the data to provide support for the implementation (George, Hall, & Stiegelbauer, 2006; Hall, Dirkson, & George, 2006; Loucks, 1983). More on CBAM, including its development, how SoC and LoU are measured, the validity and reliability of the instruments, and the use of CBAM in research, will be presented in Chapter 2. In this study, CBAM diagnostic tools were used to gauge TVIs' concerns about implementing UEB and to examine the levels at which they are currently using UEB.

Significance of the Study

Most research to date on UEB was conducted to aid in the creation of the code and to inform the decision on whether to adopt. Studies have focused on (a) perceptions of UEB from braille users, teachers, and transcribers, including their opinions about the code itself and possible impacts of adoption (BANA, 2003; BAUK, 2008; Bogart & Koenig, 2005; Cryer, Home, & Morley Wilkins, 2013b; Gerber & Smith, 2006; ICEB, 1998a-e, 1999a-d, 2000; Wetzel & Knowlton, 2006a; White, 2011a); (b) physical attributes of UEB, such as the code's effect on the length of texts brailed in the new code (Bogart, D’Andrea, & Koenig, 2004; Cryer & Home, 2008; Knowlton & Wetzel, 2006); and (c) the readability of UEB, such as the effect on braille readers' reading rates, fluency, and accuracy, and the opinions of braille readers in technical fields on the use of UEB for mathematics and science applications (Cryer, Home, & Morley Wilkins, 2013a; Holbrook & MacCuspie, 2010; Steinman et al., 2004; Wetzel & Knowlton, 2006b).
Research on implementation has been limited to a study on perceptions of braille users in Australia and New Zealand, where implementation is complete (White, 2011b), and the aforementioned BANA/CCSSO study in which states were polled on their readiness to transition to UEB (D’Andrea, 2015b).

There has been no research published on the current status of the implementation process in the United States—the extent to which TVIs have introduced UEB to their students or their concerns at this point in the transition—though the need for such information has been recognized in the field. One of the resolutions from the 4th General Assembly of the International Council on English Braille (ICEB) in 2008 called for research into the perceptions of stakeholders on the implementation, learning, and use of UEB; the resolution noted specifically the need for research into “the perspectives and recommendations of teachers of students who are blind or visually impaired relevant to the implementation of UEB” (ICEB, 2008, 8.1). D’Andrea et al. (2014) conducted a literature review of research on UEB for the purpose of creating a research agenda related to the transition to UEB in the United States and found a need for studies that “examine perceptions of code change and strategies for increasing positive attitudes toward UEB and investigations into effective transition plans on a state and national level” (p. 172).

From a practical standpoint, information on TVIs’ concerns about implementing UEB and the levels at which they are currently using UEB is needed to monitor and refine transition plans for the implementation of UEB. In Blueprint for Developing and Implementing a Plan for an Effective Transition to Unified English Braille (UEB), McLennan (2015) stresses the need for feedback on the implementation process in order to identify problems and provide any needed corrective actions.
The transition to UEB will require many changes for both personnel and infrastructure. TVIs who may have been teaching braille for years are now tasked with learning a new code, teaching it to students who may or may not already be proficient in the current (prior to UEB) braille codes, developing instructional strategies, and obtaining new materials. They will need support and resources to guide them through the process. This study provides valuable information on the status of the transition to UEB in the United States and may further the understanding of the types of supports necessary to ensure a successful implementation process. It may also expand the field of knowledge about: (1) how nationally-mandated educational innovations affect teachers at an individual level, and (2) how measuring teachers' concerns about and use of innovations can inform decisions on appropriate and effective supports for implementation.

Assumptions

The results of the study are based on participants' self-reporting. The researcher assumed that participants answered the survey and interview questions honestly based on their knowledge, understanding, and experience. Human Subject Consent Forms were provided specifying all collected information would be held confidential and only viewed by the researchers, and information on teachers’ participation or nonparticipation in the study would not be shared with school administrators. The online survey was anonymous, and pseudonyms were used in place of the real names of interview participants in all reporting. Because an invitation to participate was sent to all TVIs in the state and participation was voluntary, the researcher assumed the participants were representative of the general population of TVIs in the state.
Limitations

This study is a snapshot in time of an implementation process that will occur over several years or more. Longitudinal aspects were not studied; therefore, no conclusions can be drawn in regard to how the TVIs in the study will progress through the Stages of Concern and Levels of Use or the effectiveness of any interventions provided.

Delimitations

The transition to UEB will affect many stakeholders, including braille readers, TVIs, rehabilitation specialists, braille transcribers, and individuals and organizations that procure and deliver braille materials; however, this study focused exclusively on TVIs in order to address the K-12 educational setting. UEB training and implementation plans vary state-to-state; the subjects in the study were limited to TVIs in one southern state who volunteered to participate in the study, so generalization of the findings to TVIs in other states may not be appropriate.

Definition of Terms

- *Backtranslation* refers to translating braille materials into print
- *Change* refers to “a process through which people and organizations move as they gradually learn, come to understand, and become skilled and competent in the use of new ways” (Hall & Hord, 2015, p. 11).
- *Change Agent (also Change Leader or Change Facilitator)* refers to a person responsible for implementing an innovation by supporting, helping, assisting, and nurturing the people who are expected to change (Hord et al., 2006).
- **Concern** refers to "the composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task" (Hall & Hord, 2015, p. 85).

- **Concerns-Based Adoption Model (CBAM)** refers to a model that emphasizes the importance of understanding and addressing the personal side of change when implementing an innovation (Hall & Hord, 2015); provides diagnostic information that can help change agents use resources and provide interventions to individuals to facilitate the implementation of an innovation (Hord et al., 2006).

- **Diffusion** refers to "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1995, p. 5).

- **English Braille American Edition** refers to the literary braille code used in the United States and other countries under the jurisdiction of the Braille Authority of North America (BANA) prior to being officially replaced by UEB in 2016.

- **Innovation** refers to "any program, process, or practice—new or not—that is new to a person" (Hord et al., 2006, p. 3).

- **Intervention** refers to "any action or event that influences the individual(s) expected to be involved in the process of change" (Hall & Hord, 2015, p. 27).

- **Levels of Use (LoU)** refers to a construct of CBAM that addresses behaviors and describes how people are acting with respect to a specified change (Hall & Hord, 2015).

- **Nemeth** refers to the **Nemeth Code for Mathematics and Science Notation**, a braille code currently used in the United States for mathematical and science notation.
• **Open-Ended Concerns Statement** refers to an individual’s written description of his or her concerns about an innovation in response to the prompt: “When you think about [the innovation], what concerns do you have?” (Hall & Hord, 2015).

• **Resistance** refers to “any conduct that serves to maintain the status quo in the face of pressure to alter the status quo” (Zaltman & Duncan, 1977, p. 63).

• **Stages of Concern (SoC)** refers to a construct of CBAM that addresses the affective side of change—people’s reactions, feelings, perceptions, and attitudes (Hall & Hord, 2015).

• **Standard English Braille** refers to the literary braille code used in the United Kingdom and other countries under the jurisdiction of the Braille Authority of the United Kingdom (BAUK) prior to being replaced by UEB.

• **Translation** refers to translating print materials into braille.

• **Unified English Braille** refers to a unified braille code for all English-speaking countries, which is based on literary braille but encompasses all the signs needed to produce and read technical materials as well; adopted by BANA in 2012 for use in the United States.

**Acronyms**

BANA – Braille Authority of North America

BAUK – Braille Authority of the United Kingdom

CBAM – Concerns-Based Adoption Model

CCSSO – Council of Chief State School Officers

EBAE – English Braille American Edition

ICEB – International Council on English Braille
Outline of the Study

Chapter 1 introduced the study by describing the background of the issue, stating the problem to be addressed, and defining the purpose of the study and the research questions that will guide it. The chapter identified the theoretical framework and explained the significance of the research. Chapter 1 also presented the assumptions, limitations, and delimitations of the study, and provided operational definitions of terms used throughout the study along with an acronym list.

Chapter 2 is a literature review examining the background and research-to-date on UEB, change process theory, and the Concerns-Based Adoption Model. Chapter 3 presents the methodology of the study, including the population and sample, instrumentation, data collection procedures, and data analysis procedures. Chapter 4 presents the results and analysis of the study, and Chapter 5 contains a summary of the study, conclusions drawn from the findings, a discussion, and recommendations.
This chapter presents a review of the research and literature regarding Unified English Braille (UEB), as well as a review of the literature that has contributed to the theoretical framework and research foundation of this study. The review of literature is divided into three sections: (a) research to date on UEB, (b) change process theory, and (c) the Concerns-Based Adoption Model.

**Research-to-Date on Unified English Braille (UEB)**

D’Andrea et al. (2014) conducted a literature review of the available research and other published papers regarding UEB in order to provide researchers in the field of blindness and visual impairment a research agenda for the transition to UEB in the United States. Their search included 25 research articles/reports (nine peer-reviewed and 16 non-peer-reviewed) on UEB published between 1998 and 2013. An independent search of the literature published between 1998 and 2015 conducted for this study revealed one additional non-peer-reviewed research report (D’Andrea, 2015b).

D’Andrea et al. (2014) classified published reports into four broad categories based on the aspect of UEB covered: (a) perceptions of the code, (b) physical attributes of the code, (c) readability of the code, and (d) implementation of the code. This review will adhere to that classification. Appendix C provides an overview of the UEB research
studies covered in this review, including the methodology, number of participants, country in which the study was conducted, and whether the study was published in a peer-reviewed journal.

Studies on Perceptions of the Code

The earliest studies on UEB asked respondents to complete a written survey after reading sample material produced in the draft version of the new code. ICEB conducted an extensive international evaluation of the draft code, for which 461 users in eight countries provided input (Bogart & Koenig, 2005; ICEB, 1998a-e, 1999a-d, 2000). With the exception of respondents from the United Kingdom, the majority of respondents in each country supported the underlying principles of a unified braille code. Respondents were generally in favor of most proposed new or changed signs; however, there was greater variation among respondents as to, and generally less support for, changes related to the spacing and the proposed omission of existing contractions (Bogart & Koenig, 2005). In a similar study conducted by BANA (2003) in the United States and Canada, respondents were more negative toward the code than positive, and they indicated that the BANA Board, before making a decision regarding the adoption of UEB, should: (1) ask those using old codes and those using new codes how they feel, (2) consider conservation of space, and (3) consider the burden on blind readers who would need reeducation upon implementation.

In addition to written surveys, researchers also used focus groups to solicit feedback on the code. Wetzel and Knowlton (2006a) conducted five focus groups composed of professionals (teachers and transcribers) and end users (adult braille readers) who worked with braille on a daily or weekly basis. The study explored the
effect adopting UEB would have on users and producers of braille materials.

Respondents indicated the changes to the literary braille code appeared to be relatively minor, but the changes to the mathematics code were significant and potentially detrimental. One opinion common to teachers, transcribers, and end users was the new code should be adopted only if the change would make the code better for end users.

Gerber and Smith (2006) reported on 13 focus groups of students and teachers throughout Canada. They found that, although nearly all participants expressed serious concern about the effect of the new code on braille readers, both teachers and students indicated that they would be willing to make the change if the change led to tangible benefits for braille users.

As mentioned previously, the United Kingdom was the only country in ICEB’s original 1998 evaluation in which the majority of respondents did not support a unified braille code. At that time, only 37% of the 19 respondents indicated they favored a unified code (Bogart & Koenig, 2005; ICEB, 2000). In 2007 and 2008, the Braille Authority of the United Kingdom (BAUK) conducted further evaluations (BAUK, 2008). Of the 470 responses received, 76% said they would not like to see UEB adopted in the United Kingdom, and 66% did not think the adoption of UEB in the United Kingdom would benefit future braille readers. Based on these results, BAUK decided not to introduce UEB in the United Kingdom, but to revisit the question in five years and to conduct research in the meantime to inform future decision-making (BAUK, 2008). Over the next three years, a literature review (Cryer et al., 2011) and a series of studies were conducted (Cryer & Home, 2008; White, 2011a-b; and Cryer et al., 2013a-b), and based on the findings, in 2011, two years ahead of the scheduled date for reevaluation, the
United Kingdom Association for Accessible Formats Board (UKAAF) voted to adopt UEB (UKAAF, n.d.).

In two of the UK studies, feedback was solicited from braille users, teachers, and transcribers regarding their opinion of the code and its readability. Both studies revealed, overall, participants could read the UEB samples they were given without much difficulty. White (2011a) found all magazine subscribers who were sent an anthology of essays produced in UEB were able to read it: 37.9% could read it without any difficulty, 49.5% could read it, but more slowly than usual, and 12.6% could read it, but found it difficult. No subscribers reported they were unable to read it. The main complaint about UEB was the increased space it used. Cryer et al. (2013b) found, overall, participants in focus groups consisting of students and adult braille readers, teachers, and transcribers could read the UEB samples without training or reference materials outlining the changes; however, while some felt they could get used to the changes over time, others disliked it to the extent they would choose not to read braille at all rather than read UEB if it were adopted. Key concerns expressed included the additional space needed for materials brailled in UEB and the potential difficulty of transition.

Studies on Physical Attributes of the Code

One of the most controversial features of UEB is that it uses numbers formed in the upper part of the braille cell (as per literary braille codes) as opposed to numbers formed in the lower part of the braille cell (as per the Nemeth Code of Braille Mathematics and Science Notation). Currently, the use of upper cell numbers (literary codes) requires a letter indicator when a letter follows a number, whereas use of lower cell numbers (Nemeth Code of Braille Mathematics and Science Notation) requires a
punctuation indicator when punctuation follows a number. The committee responsible for developing the unified code made the decision to use upper cell numbers based on the analysis of a small number of literary and technical texts. They concluded, “numbers and punctuation marks are more commonly juxtaposed than numbers and letters (even, surprisingly, in material with heavy technical content) and so upper numbers require fewer indicators than lower numbers overall” (Bogart, Cranmer, & Sullivan, 2000, p. 176).

Bogart et al. (2004) utilized a computer program to count the occurrences of number/letter and number/punctuation combinations in samples from 16 textbooks (8,429 pages of text), including both literary texts (literary code) and technical texts (Nemeth Code of Braille Mathematics and Science Notation), to verify the assumption that numbers generally come into contact with punctuation more often than with letters. As predicted, a much higher instance of number/punctuation combinations were found in the texts examined, supporting the idea upper numbers may save space when transcribing materials into UEB by eliminating the need for punctuation indicators. It should be noted, however, that algebra texts, which would have a much higher frequency of number/letter sequences than most texts, were not examined.

A recurring theme in the studies on perceptions about UEB was the concern expressed by braille users, teachers, and transcribers about the increased space required by UEB and the effect that may have on reading speed and cost for production (Cryer et al., 2011b; Gerber & Smith, 2006; Wetzel & Knowlton, 2006a; White, 2011a). Two studies addressed these concerns by comparing UEB with existing American codes (Knowlton & Wetzel, 2006) and UK codes (Cryer & Home, 2008) for both literary and
technical texts. Knowlton and Wetzel (2006) compared text samples brailled in *English Braille American Edition* (the American literary code), the *Nemeth Code of Braille Mathematics and Science Notation*, and the *Computer Braille Code* with the same text samples brailled in UEB and found that changes in the total length of text varied greatly with the type of text being compared. Basic literary text for material at the fourth-grade level was 4%–7% longer in UEB. In the mathematical computational format, algebra, and calculus were 21%–54% longer in UEB, linear arithmetic was 1% longer, and computer code samples were 1% longer to 4.5% shorter. Cryer and Home (2008) compared capitalized and non-capitalized *Standard English Braille* (SEB), both of which were used in the UK, to UEB and found the majority of the increase in space used by UEB was due to its requirement for capitalization. For literary materials, UEB increased the number of pages by 5.5% (one extra page for every 18 pages) compared to non-capitalized SEB and by 1.97% (one extra page for every 50 pages) compared to capitalized SEB. The increase for technical text samples depended on the complexity of the material and the amount of non-technical text included, with UEB requiring 4%–12% more lines. It is not clear whether algebra was tested, as the samples were referred to only as “elementary maths” and “higher maths.”

**Studies on Readability of the Code**

Before declaring the code complete and ready for adoption, it was important to address concerns about its readability. Steinman et al. (2004) conducted a pilot study to examine the degree to which experienced braille readers were able to transfer their reading skills from the current literary code, *English Braille American Edition*, to UEB. The researchers found there were significantly more regressions (backtracking with
fingers to re-read) and a lower reading rate in UEB; however, there were more miscues reading in English Braille American Edition. The researchers hypothesized the slower reading speed and unfamiliarity with the code caused the participants to monitor their readings more carefully in UEB, thus fewer miscues occurred. They concluded that although reading UEB may initially be slower than reading a familiar braille code, this was likely due to unfamiliarity, and with minimal training, most skilled braille readers likely would integrate new UEB cell patterns with relative ease. In the posttest interview, five of the eight participants stated they were not in favor of switching to UEB. Wetzel and Knowlton (2006b) addressed how various changes in UEB would affect reading rates in both literary and technical texts. Reading of literary material, as measured in cells per second, was not significantly different when spaces were added between words written without spaces in English Braille American Edition. There was, however, a definite trend toward longer reading time in cells per second for passages with omitted contractions. When reading numbers, there was no significant difference in reading rates for Nemeth (lower) numbers and English Braille American Edition (upper) numbers in samples of two-digit numbers, three-digit numbers, mixed numbers and words, and numbers in text samples. The reading rates for single-digit numbers and mixed digit numbers were significantly faster with English Braille American Edition (upper) numbers.

Holbrook and MacCuspie (2010) and Cryer et al. (2013a) sought input on the effect of UEB from expert technical code users. In the first study (Holbrook & MacCuspie, 2010), five braille readers from Canada and United States who were employed in highly technical fields read technical materials in UEB and then participated in a focus group. The participants indicated they were able to read UEB technical
samples and they believed the UEB code was understandable and represented technical information as well as traditional codes. They believed UEB could be used effectively by people employed in highly technical fields. In a partial replication of Holbrook and MacCuspie, Cryer et al. (2013a) investigated how six technical braille users in the United Kingdom coped with UEB coding and how they felt about the potential change to UEB. All participants felt they were able to read and understand the UEB technical coding, despite having no access to a symbols list. Though using the unfamiliar code was slower, they felt if UEB were adopted and they were given reference material, they would be able to read the code without difficulty in time. Of the six participants, one was against adopting UEB, one did not personally want to use UEB but could see some benefits, and four were in favor of adoption.

Implementation Studies and Reports

Two studies investigated the implementation of UEB. White (2011a) interviewed 10 braille readers from Australia and New Zealand, where UEB was adopted in 2005, regarding implementation in those countries to inform the United Kingdom’s decision of whether to adopt UEB. People who used UEB professionally, such as teachers and transcribers, felt the transition period was generally good. General braille users reported experiencing mild irritation at worst. A recurring theme was that many users continued to write in the old code. Only one person reported finding the transition difficult and unnecessary. Six years after adoption, eight of the 10 respondents were glad their country switched to UEB, and nine out of the 10 recommended the United Kingdom adopt the code.
In the United States, BANA distributed a survey to assessment directors in all 50 states in late 2014 to gather information about each state’s readiness to transition to UEB (D’Andrea, 2015b). Of the 32 states that completed the survey, 28 indicated their states were familiar with UEB, yet only 22 had a UEB Implementation Team in place to create a transition plan. Timelines for providing textbooks in UEB varied, with 13 states saying they would start in the spring or fall of 2015, seven in January 2016, six in the fall of 2016, and six not responding or indicating the date had not yet been determined. States also varied in their plans for producing mathematical and science educational materials, with some states responding that they planned to provide materials in both codes, some planning to provide materials in Nemeth only, and some planning to provide materials in UEB only. The key issues identified by survey participants pertaining to the transition to UEB were in the following areas: (a) the code itself (particularly issues regarding mathematics), (b) assessment procedures and practices, (c) production of instructional materials in UEB, (d) training of transcribers and teachers in the new code, and (e) financial considerations (D’Andrea, 2015b).

In addition to research on implementation, some anecdotal reports have been provided by representatives from the braille authorities in countries that have adopted UEB. Highlights from the country reports delivered at the ICEB 5th General Assembly in South Africa in 2012 as well as some recently published reports are included below.

South Africa adopted UEB in May 2004 (BSA, n.d.). Roll-out of UEB in the first three grades began in 2008, followed by the roll-out of the non-technical components of UEB in all grades. The technical component was to be phased in from the lower grades.
Representatives reported a great need for teacher training in the technical code (de Klerk, 2012).


Australia adopted UEB in May 2005 (ABA, 2015). A five-year transition period began immediately, with UEB transcription of all new materials beginning in 2006. UEB was not introduced to students in Years 11 and 12, the final years of secondary school. Students were allowed to choose which braille code they would use for external school assessments and examinations during the five-year transition period (Gentle, Steer, & Howse, 2012). In a report to ICEB in 2012, the chair of the Australian Braille Authority (ABA) stated that UEB was fully implemented in Australia, with all literary and technical material produced in UEB and UEB being fully operational throughout the school system (Simpson, 2012). She noted braille users still read many things in the old code, since materials created before the transition were still in use.

New Zealand adopted UEB in November 2005 (BANZAT, n.d.). UEB training began in 2007, and student materials were made available in UEB in 2008. UEB was implemented in schools in a phased approach, with all braille materials for younger students being produced in UEB, while decisions about the transition to UEB for mathematics and science were made on a case-by-case basis for students reaching the end of primary and beginning secondary education. Children adapted well, but there were challenges for teaching and support staff (Howse, Gentle, Stobbs, & Reynolds, 2010; Reynolds, Bellamy, Stevens, & Smith, 2012).
Canada adopted UEB in April 2010 (CBA, 2010). In 2012, the Canadian Braille Authority (CBA) reported that little had happened in regard to implementation, mainly due to issues dealing with the multiple ministries of education (in ten provinces and three territories) and their concerns regarding the cost of the transition to UEB (Goulden, 2012). In 2013, a committee was created to create a national implementation plan, though each province was expected also to develop its own plan based on local needs and resources. The target date for full implementation is September 2017. Plans include a phased approach for introducing UEB to students based on grade (Marshall & Holbrook, 2015).

The United Kingdom adopted UEB in October 2011 (UKAAF, n.d.). In 2012, a representative from the United Kingdom Association for Accessible Formats (UKAAF) reported a draft plan was in work, but it did not yet contain proposed dates for implementation (Osborne, 2012).

The United States adopted UEB in November 2012 (BANA, 2012). The national implementation plan includes four phases: Phase I, the information year, in 2013; Phase II, the infrastructure year, in 2014; Phase III, the instructional year, in 2015; and Phase IV, the implementation year, in 2016. BANA (2014) encouraged states to create their own implementation plans based on the capacities, resources, and systems available to them. In 2015, the two biggest unresolved issues were the production of technical materials and the timing of high-stakes standardized tests (D’Andrea, 2015a).

Based on the reported experiences of countries that have begun the UEB implementation process, one may extract themes common to a successful transition: exposing users to UEB materials, informing stakeholders about the changes, gradual
implementation of UEB in education, and including lists of new symbols in UEB materials (Cryer et al., 2011).

Summary of UEB Research

In their literature review, D’Andrea et al. (2014) noted a “paucity of literature on UEB” and that the small number of research studies on UEB and the wide variety of topics made direct comparisons between studies difficult (p. 152). Limitations of the studies included nonrandom sampling and small sample sizes (three of the four studies on readability had fewer than 10 subjects). In addition, most of the studies (16 of the 25) were not peer reviewed. D’Andrea et al. also noted that although there is insight to be gained from anecdotal reports available on the status of implementation efforts in other countries, those experiences may not be generalizable. The United States has a much larger braille-reading population than other countries that have adopted UEB, and it is the only country to maintain a separate technical code for math and science notation.

The purpose of the literature review by D’Andrea et al. (2014) was to provide researchers in the field of blindness and visual impairment with a research agenda for the transition to UEB in the United States. They recommended studies investigating: perceptions of code changes and strategies for increasing positive attitudes toward UEB; effective transition plans on a state and national level; mathematics instruction and how educators will teach mathematics in the future; and student outcomes as UEB is implemented. This study addressed TVIs’ perceptions of code changes, including their concerns about the transition, their current use of UEB, and their ideas regarding what can be done to make the transition easier.
Change Process Theory

Understanding the change process and how to manage it is crucial when implementing an innovation (Ely, 1990; Fullan, 2007; Hall & Hord, 2015; Havelock & Zlotolow, 1995; Rogers, 1995; Zaltman & Duncan, 1977); however, the number of change models available makes it challenging to determine which is appropriate in a certain situation. In Surviving Change: A Survey of Educational Change Models, Ellsworth (2000) expanded on the idea that the change process is a specialized instance of the general communications model (Rogers, 1995) to provide an organizing framework for understanding the change process and determining which model best applies in a given situation. He explained in the communication model, a sender wishes to communicate a message to a receiver. The message is sent via a medium which establishes a channel through the environment between the sender and receiver. Interference in the environment may disrupt the medium or distort the message. The change communication model works essentially in the same manner. A change agent wishes to communicate an innovation to an intended adopter. This is accomplished using a change process which establishes a channel through the change environment between the communicants. Resistance in the environment may disrupt the change process or distort how the innovation appears to the intended adopter.

Different models of change highlight the different components of this change communications model and are therefore applicable in different change applications. Ellsworth (2000) chose one classical change model to illustrate each component of the change communication model:

- the innovation (the change to be implemented): Diffusion of Innovations model (Rogers, 1995);
• the change environment: *Conditions of Change* model (Ely, 1990);

• the change agent (the person facilitating the change): *New Meaning of Educational Change* model (Fullan, 2007);

• the change process: *Change Agent's Guide* model (Havelock & Zlotolow, 1995);

• resistance: *Strategies for Planned Change* model (Zaltman & Duncan, 1977); and

• the intended adopter: *Concerns-Based Adoption Model* (Hall & Hord, 2015).

These models and the applications in which they may be of most use to practitioners are briefly described in the following sections.

**Focus on the Innovation**

Rogers (1995) pioneered the theory of *Diffusion of Innovations*. He defined diffusion as “the process by which an innovation is communicated through certain channels over time among members of a social system” (p. 5). The time required for diffusion varies. Rogers identified five variables that may affect the rate of adoption of an innovation: (1) the perceived attributes of the innovation, (2) the type of innovation-decision, (3) the communication channels, (4) the nature of the social system, and (5) the extent of change agents’ promotion efforts. Of all these variables, however, the perceived attributes of the innovation account for the greatest variance in rate of adoption. According to Rogers, research indicates innovation attributes account for between 49 and 87 percent of variance of in rate of adoption. Perceived attributes include:

• Relative advantage (“Is it better than what I’ve got now?”)

• Compatibility (“Does it conflict with my values, practices, or needs?”)
• Complexity ("Is it too difficult to understand or use in authentic settings?")

• Trialability ("Can I try it out first, and can I go back to what I was doing if I don’t like it?")

• Observability ("Can I watch someone else using it before I decide whether to adopt?")

[Quoted examples of attributes in the above list are from Ellsworth, 2000, p. 61.]

This model may be most useful to practitioners when developing an innovation or deciding how to adapt the innovation for a particular use; however, it can also be useful in determining how to present the innovation to intended adopters (Ellsworth, 2000). Rogers (2002) explained changing adopters’ perceptions of the innovation, particularly its relative advantage, is one strategy that may be used to speed up its diffusion.

Focus on the Change Environment

Ely (1990) posited that regardless of the qualities of an innovation, successful implementation occurs only if the right conditions exist or can be created in the environment. He identified eight Conditions of Change that appear to facilitate the implementation of innovations:

• Dissatisfaction with the status quo ("There has to be a better way.")

• Knowledge and skills exist ("I can do this" or "I can learn quickly.")

• Resources are available ("I have everything I need to make it work.")

• Time is available ("I have time to figure this out and to adapt my other practices.")

• Rewards or incentives exist for participants ("I’m going to get something out of this, too.")

• Participation is expected and encouraged ("This is important, and I have a voice in it.")
• Commitment by those who are involved ("Administrators and faculty leaders support it.")

• Leadership is evident ("I know who to turn to for encouragement, and they're available.")

[Quoted examples of conditions in the above list are from Ellsworth, 2000, pp. 76–77.]

Practitioners may find this model most useful in the initial determination of whether change is likely to succeed under existing circumstances (Ellsworth, 2000). Ely (1990) described how the eight conditions can be used as a vehicle for planning and monitoring change. He recommended that each condition be presented as a question in the planning phase: "Is there dissatisfaction with the status quo?" "Are resources available?" "Is leadership evident?" This type of needs assessment gives practitioners information helpful in determining whether change is likely to succeed under the existing conditions. The eight listed conditions can serve as an inventory of the setting after an innovation is adopted: "How many of the conditions currently exist?" "Which conditions require improvement to help in our situation?" They also may be used as a checklist to ensure optimum conditions for success. Interventions can be directed at improving one or more of the conditions.

Focus on the Change Agent

Fullan (2007) stressed the importance of viewing every person as a change agent and understanding change has different meaning to people in different roles. He stated, "Assume that any significant innovation, if it is to result in change, requires individual implementers to work out their own meaning" (p. 123). The New Meaning of
Educational Change model emphasizes the need for change agents in many different roles to build coalitions to work toward a common goal.

Fullan described the characteristics and change postures for the following stakeholders in educational change: the teacher, the principal, the student, the parent and the community, the district administrator, governmental agencies, and teacher-educators (pre-service and professional development). He addressed the different roles of stakeholders in the process of educational change and provided strategies specific to each role for managing or dealing with change. This model may help practitioners develop change activities that will be effective for change agents in particular roles (Ellsworth, 2000).

Focus on the Change Process

Havelock and Zlotolow (1995) described The Change Agent's Guide as a guide to the process of innovation for practitioners. They identified seven interrelated stages of planned change, which they dubbed the “C-R-E-A-T-E-R” model:

- Stage 0: Care: Arouse or connect to the concern that counts the most.
- Stage 1: Relate: Build relationships (to client and within the client system).
- Stage 2: Examine: Define the problem in workable terms (= “Diagnosis”)
- Stage 3: Acquire: Search and find relevant resources.
- Stage 4: Try: Find what looks like the best solution and put it to the test.
- Stage 5: Extend: Diffuse the change through the system and gain acceptance.
Havelock and Zlotolow noted change agents primarily serve four roles in the change process: catalyst, solution giver, process helper, and resource linker. Practitioners may find this model most useful when beginning to plan implementation effort (Ellsworth, 2000). Structuring the plan around the seven steps may help change agents determine where in the process and in what role they can be the most effective.

Focus on Resistance to Change

Zaltman and Duncan (1977) approached change from the opposite perspective of most change models. While most models provide a framework for assessing and developing factors promoting change, the *Strategies for Planned Change* model provides a framework for diagnosing the presence of resistance factors and acting to reduce them (Ellsworth, 2000).

Zaltman and Duncan (1977) defined resistance as “any conduct that serves to maintain the status quo in the face of pressure to alter the status quo” (p. 63). They noted resistance can be healthy and justifiable, and change agents can use resistance constructively for insight into the various conditions that should be considered in developing intervention strategies. They identified 18 sources of resistance in four major categories:

*Cultural barriers to change:*

1. Cultural values and beliefs ("The innovation is wrong.")
2. Cultural ethnocentrism ("My culture is superior—or the change agent thinks his is.")
3. Saving face ("I can’t do that; I’d never live it down.")
4. Incompatibility of a cultural trait with change ("It just won’t work here because...")
Social barriers to change:

5. Group solidarity ("I can’t do this because it would be a hardship for my coworkers.")
6. Rejection of outsiders ("Nobody who isn’t ‘one of us’ could create something of value.")
7. Conformity to norms ("If I participated in this, I would be ostracized.")
8. Conflict ("There are too many factors here pulling in different directions.")
9. Group introspection ("I’m too much a part of this group to see its problems objectively.")

Organizational barriers to change:

10. Threat to power and influence ("If we do this, I won’t be as important anymore.")
11. Organizational structure ("This cuts across department lines and intrudes on their turf.")
12. Behavior of top-level administrators ("The boss isn’t doing it; why should I?")
13. Climate for change in organization ("We don’t need to change, or couldn’t if we tried.")
14. Technological barriers for resistance ("I can’t understand this or apply it to my work.")

Psychological barriers to change:

15. Perception ("My mind is made up: I just don’t see it the way you do.")
16. Homeostasis ("All this change is just too uncomfortable.")
17. Conformity and commitment ("This just isn’t the way people in my profession do things.")
18. Personality factors ("I can’t do this; it just isn’t right for who I am.")

[Quoted examples of barriers in the above list are from Ellsworth, 2000, pp. 184–185.]

This framework offers the practitioner a diagnostic tool for identifying the root cause of resistance and designing interventions to address the issues (Ellsworth, 2000).

Focus on the Intended Adopter

The Concerns-Based Adoption Model (CBAM), first proposed by Hall, Wallace, and Dossett in 1973, provides a method by which change agents can identify and
understand the concerns and behaviors of individuals in the change process so they can provide appropriate support (Hord et al., 2006). The Stages of Concern (SoC) and Levels of Use (LoU) dimensions of CBAM track an intended adopter’s developmental progress over the timeline of the implementation effort. The SoC construct focuses on the affective progress of intended adopters, while the LoU construct maps the adopter’s behavioral progress in putting the innovation into practice. These diagnostic tools generate data and information to provide evidence of the current extent and quality of implementation of an innovation (George et al., 2006; Hall et al., 2006). This data can be used prescriptively to design concerns-based interventions to support the implementation (Hall, 1979; Hord & Loucks, 1980; Hord et al., 2006).

Ellsworth (2000) noted the CBAM model has unique strengths, including dimensions (the SoC and LoU mentioned above) that are paired with valid and reliable instruments for diagnosing status and an “exceptionally rich knowledge base with strong empirical support” yielded by decades of use in research (p. 43). This perspective is useful for diagnosing the implementation effort’s progress at the level of the individual adopter and for designing effective interventions based on adopters’ current SoC and LoU.

**Summary of Change Process Theory**

In the previous section, six change models were introduced, each focusing on a different component of Ellsworth’s change communication model. The value of each model to a practitioner will depend on the situation; a model may be more or less appropriate at different points in the change process. For this study, the researcher chose to use the Concerns-Based Adoption Model (CBAM) to examine the transition to Unified
English Braille (UEB) in the United States. In this particular change process, the
innovation (UEB) has been created, and the adoption has been mandated. The researcher
chose to evaluate the implementation effort’s progress in the K-12 environment by
viewing the change from the perspective of the intended adopters: teachers of students
with visual impairments (TVIs). To that end, the researcher used CBAM’s diagnostic
tools to gauge TVIs’ concerns about implementing UEB and to examine the levels at
which they are currently using UEB. More on CBAM, including its development, how
SoC and LoU are measured, the validity and reliability of the instruments, and the use of
CBAM in research, is presented in the following section.

Concerns-Based Adoption Model (CBAM)

In the 1970s, the National Institute of Education funded studies to look at the
educational change and improvement process, with the idea that the failure of new
programs might have more to do with the change process than the merit of the programs
themselves (Hord et al., 2006). A group of researchers at the Research and Development
Center for Teacher Education (R&DCTE) at the University of Texas at Austin began a
long-term study of the school improvement process, and their work led to the
development of CBAM and its diagnostic tools (Hall et al., 1973).

CBAM focuses on the adopter of the innovation, emphasizing the importance of
understanding and addressing the personal side of change when implementing a new
program, process, or practice (Hall & Hord, 2015). The model evolved from the work of
Frances Fuller. Fuller (1969) discovered teachers’ concerns followed a developmental
sequence as they gained experience over time. In the pre-teaching phase, education
students’ biggest concerns were unrelated to teaching, such as concerns about their
coursework or relationships. In the early teaching phase, student teachers and beginning teachers expressed self concerns, focusing on their own abilities and preparedness. With more experience, task concerns surfaced, such as preparation of materials and scheduling. In the late teaching phase, experienced teachers demonstrated impact concerns, focusing on student achievement and professional development.

Stages of Concern

The researchers at R&DCTE found a similar development of concerns over time occurred in the adoption of an innovation. This led to the construct of Stages of Concern of an Innovation (SoC) (Hall & Rutherford, 1976). SoC describes the kinds of concerns related to an innovation an individual may experience over time, progressing from unrelated concerns ("I don’t know anything about it" or "I’m more concerned about other things") to personal or self concerns ("What will this mean for me?") to management concerns ("How long will it take to prepare materials?") to impact concerns ("How is this affecting my students?") (Hall et al., 2006; Hall & Rutherford, 1976). These stages are defined in Table 3.
### Table 3. Stages of Concern about the Innovation: Paragraph Definitions

<table>
<thead>
<tr>
<th>Levels of Concern</th>
<th>Stages of Concern</th>
<th>Definitions of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impact</strong></td>
<td>6 Refocusing</td>
<td>The focus is on the exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. Individual has definite ideas about alternatives to the proposed or existing form of the innovation.</td>
</tr>
<tr>
<td></td>
<td>5 Collaboration</td>
<td>The focus is on coordination and cooperation with others regarding use of the innovation.</td>
</tr>
<tr>
<td></td>
<td>4 Consequence</td>
<td>Attention focuses on impact of the innovation on “clients” in the immediate sphere of influence.</td>
</tr>
<tr>
<td><strong>Task</strong></td>
<td>3 Management</td>
<td>Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, scheduling, and time demands are utmost.</td>
</tr>
<tr>
<td><strong>Self</strong></td>
<td>2 Personal</td>
<td>Individual is uncertain about the demands of the innovation, his/her inadequacy to meet those demands, and his/her role with the innovation. This includes analysis of his/her role in relation to the reward structure of the organization, decision making, and consideration of potential conflicts with existing structures or personal commitment. Financial or status implications of the program for self and colleagues may also be reflected.</td>
</tr>
<tr>
<td><strong>Unrelated</strong></td>
<td>0 Unconcerned</td>
<td>Little concern about or involvement with the innovation is indicated. Concern about other thing(s) is more intense.</td>
</tr>
</tbody>
</table>

Source: Hall & Hord, 2015, p. 86

Hord et al. (2006) note at any given time individuals will have concerns at different stages; however, the stage or stages with the most intense concerns will vary as
implementation progresses. The emergence and resolution of concerns appear to be developmental; early concerns must be resolved before later concerns emerge. Self concerns will be most intense early in the change process, and as these are resolved, task concerns intensify. These task concerns must be resolved before impact concerns emerge. This hypothesized change of concerns over time is illustrated in Figure 1.

Figure 1. Hypothesized Development of Concerns  
Source: Hord, 1981, p. 6
The SoC process involves using one or more of three techniques to assess concerns: the One-Legged Interview, the Open-Ended Concerns Statement, and/or the SoC Questionnaire (SoCQ) (Hall & Hord, 2015). The One-Legged interview is a brief and informal conversation, typically in passing, in which a change agent encourages an implementer to describe his or her use of, and thoughts and feelings about, an innovation. It is quick and unobtrusive, and it shows the implementer the change agent is interested and supportive; however, its accuracy is limited.

The Open-Ended Concerns Statement (Hall & Hord, 2015; Newlove & Hall, 1976) refers to an individual's written description of his or her concerns about an innovation in response to the prompt: “When you think about [the innovation], what concerns do you have?” The content is analyzed to determine the overall theme of the concern(s) expressed (unrelated, self, task, or impact), and then re-read to assign a specific SoC. An advantage is concerns are expressed in the respondent's own words; however, the amount of information given varies widely among respondents, and reliability is an issue, since different people may interpret statements in different ways.

The SoCQ (George et al., 2006; George, Hall, Stiegelbauer, & Litke, 2008; Hall, George, & Rutherford, 1977) is a quick-scoring written questionnaire. Respondents indicate the degree to which each of 35 statements related to an innovation is true for them at the present time by selecting a value on a Likert-type scale ranging from 0—Irrelevant to 7—Very true of me now. There are five statements for each stage of concern.

Below are examples of actual statements on the questionnaire (followed by the stage each statement addresses):

12. I am not concerned about this innovation at this time. (Stage 0 — Unconcerned)
6. I have a very limited knowledge of the innovation. (Stage 1 – Informational)

33. I would like to know how my role will change when I am using the innovation. (Stage 2 – Personal)

4. I am concerned about not having enough time to organize myself each day. (Stage 3 – Management)

11. I am concerned about how the innovation affects students. (Stage 4 – Consequence)

29. I would like to Coordinate with others to maximize the innovation’s effects. (Stage 5 – Collaboration)

22. I would like to modify our use of the innovation based on the experiences of our students. (Stage 6 – Refocusing)

The raw score for each stage is the sum of the responses to the five statements on the instrument corresponding to that stage. Tables are provided to convert raw stage scores to percentiles, and the resulting concerns profile is created by plotting the normed percentile values for each stage on a line graph. Concerns profiles can be created for individuals, groups, or subgroups.

Original development of the SoCQ lasted three years, and the resulting instrument was tested for estimates of reliability, internal consistency, and validity with several samples and 11 innovations (George et al., 2006). Studies comparing SoCQ data to concerns ratings based on interviews showed the SoCQ to be a valid instrument. The questionnaire also has strong reliability estimates and internal consistencies. In a study conducted in 1974, 830 teachers and professors responded to the 35-items SoCQ. Researchers examined whether responses to individual statements on the questionnaire correlated more highly with responses to other statements measuring the same stage than to responses to statements for other stages. Alpha-coefficients (coefficients of internal reliability) for each stage ranged from .66 to .83. Two weeks later, 132 of the original
respondents completed the SoCQ again. Test/retest reliabilities ranged from .65 to .86 (Hall & Hord, 2015).

Hall and Hord (2015) asserted that the main advantage of the SoCQ is it is a valid and reliable instrument, and concerns profiles can be generated from the data. For this reason, the SoCQ is recommended for research applications. Often, the Open-Ended Statement of Concern is used in conjunction with the SoCQ. By understanding where staff members fall within the seven stages of concern and getting a snapshot of their specific concerns in their own words, change agents can address those concerns by providing appropriate training, resources, or other supports.

Levels of Use

The Levels of Use (LoU) construct addresses behavior as individuals adopt and implement new ideas and innovations. Research indicates users of an innovation will fall into one of eight classifications, or behavior profiles, ranging from nonuse to advanced use (Hall et al., 2006; Hall & Hord, 2015). Each level has an operational definition that is behavior-based and action-oriented as shown in Table 4.
Table 4. Levels of Use of the Innovation

<table>
<thead>
<tr>
<th>Users</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level VI Renewal: State in which the user re-evaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field, and explores new goals for self and the system.</td>
<td></td>
</tr>
<tr>
<td>Level V Integration: State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their common sphere of influence</td>
<td></td>
</tr>
<tr>
<td>Level IVB Refinement: State in which the user varies the use of the innovation to increase the impact on clients within immediate sphere of influence. Variations are based on knowledge of both short- and long-term consequences for clients</td>
<td></td>
</tr>
<tr>
<td>Level IVA Routine Use: Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.</td>
<td></td>
</tr>
<tr>
<td>Level III Mechanical Use: State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.</td>
<td></td>
</tr>
<tr>
<td>Level II Preparation: State in which the user is preparing for the first use of the innovation.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nonusers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I Orientation: State in which the user has recently acquired or is acquiring information about the innovation and/or has recently explored or is exploring its value orientation and its demands upon user and user system.</td>
<td></td>
</tr>
<tr>
<td>Level 0 Nonuse: State in which the user has little or no knowledge of the innovation, has no involvement with the innovation, and is doing nothing toward becoming involved.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Hall & Hord, 2015, p. 108

Hord et al. (2006) have found people tend to move sequentially from LoU 0 (nonuse) to LoU IVA (routine use); however, this may take several years. Their research shows 60–70% of first-year users of an innovation are at Level III (Mechanical Use), and
it is common to find at least 20% of teachers in any school are nonusers even in the second and third years of implementation. By assessing the LoU of intended adopters, change agents can evaluate the overall implementation process and facilitate the performance of individual users through appropriate interventions.

LoU is assessed through the use of a specially-designed Focused Interview Protocol (Hall et al., 2006; Loucks, Newlove, & Hall, 1975). The overall design of the LoU interview is a branching format, with decision points guiding the interviewer to the next set of questions. The interviewer supplements required questions with appropriate, open-ended, probing questions to stimulate the interviewee to describe and provide examples of behaviors. Interviews are typically completed in 20 to 30 minutes. LoU Focused Interviews are rated using a rubric to determine the Level of Use in seven domains: Knowledge, Acquiring Information, Sharing, Assessing, Planning, Status Reporting, and Performing, as well as the overall Level of Use.

Hall and Loucks (1977) conducted two targeted studies in the 1970s to test and verify LoU interviews as a reliable and valid way to measure LoU. In the first study, 1,381 LoU interview tapes were evaluated by multiple raters, and traditional reliability coefficients were obtained using the ratings given by the first two raters on each of the tapes, regardless of agreement. Inter-rater reliabilities ranged from .87 to .96 on the overall Level of Use. In the second study, 45 teachers were interviewed using the LoU protocol, and 17 teachers representing a stratified sample including all LoU levels were selected for ethnographic observation. The ethnographers observed the teachers for one full day and assigned an LoU rating to the teachers. The ethnographers then developed a set of written protocols based on their observations. A comparison between the
ethnographers' LoU ratings of the teachers and the consensus LoU interview ratings yielded a correlation coefficient of .98. A comparison between the consensus ratings of independent readers of the ethnographers’ written protocols and the consensus LoU interview ratings yielded a correlation coefficient of .65.

Interventions

The focus of CBAM is on identifying the concerns and behaviors of those affected by the change, so change agents can support them through the implementation process. Research suggests most changes in education take three to five years to be implemented at a high level; however, by understanding the concerns of the individuals affected by the change and examining their current level of use or nonuse of the innovation, change agents can provide appropriate support, significantly improving the odds of success and reducing the time required for implementation (George, Hall, & Uchiyama, 2000; Hall & Loucks, 1977; Hall & Rutherford, 1976). In particular, by using the diagnostic components of CBAM, SoC and LoU, change agents can identify concerns and analyze the current use of innovation in order to design interventions that will resolve those concerns and facilitate and accelerate the implementation of the innovation (Hall et al., 1973).

CBAM in Research

CBAM has been used in research since its conception in the 1970s. Early research on SoC included studies on the affective and behavioral change in individuals involved in implementation (George & Rutherford, 1978), studies facilitating institutional change using the individual as the frame of reference (Hall, 1978), and longitudinal
studies of the application of the SoC in school settings (Hall, Hord, & Griffin, 1980; Loucks & Melle, 1980; Rutherford & Loucks, 1979), and together, these studies present “evidence of the reliability of the Stages of Concern in describing and predicting teacher progress in response to a change effort” (George et al., 2006, p. 57).

George et al. (2006) conducted a literature review to examine the current applications of SoC in research. They determined that in studies conducted between 1995 and 2005, SoC was primarily used: (a) as a tool to help researchers evaluate and understand a change process and support the implementation process, and (b) as a means to develop, focus, and support professional development. Themes in the research they examined included:

- Lower-stage concerns (Information, Personal) need to be supported and resolved before higher stage concerns, or concerns related to student outcomes, emerge (Börner, 2003; Rakes & Casey, 2002; van der Vegt & Vandenberghe, 1992; Yuliang & Huang, 2005).

- Movement through the stages of concern is more difficult to track when the innovation or the environment are complex (Bresnitz, Ross, Hall, & Stiegelbauer, 1997; Gwele, 1997; Hargreaves et al., 2002, 2003; James & Lamb, 2000).

- Use of concerns data is effective in supporting ongoing training (Börner, 2003; Casey & Rakes, 2002; Christou, Eliophotou-Menon, & Philippou, 2004; Dobbs, 2004; Hawkes, Cambre, & Lewis 1999; Hope, 1997; Ward, West, & Isaak, 2004).

Hall et al. (2006) conducted a similar literature review to examine the current applications of LoU in research. They found studies utilizing LoU can be divided into five main categories: (a) informing the LoU process and CBAM in general, (b) informing the change process in general, (c) assessing interventions, (d) examining how the implementation of an innovation affects learning and other outcomes, and (e) assessing implementation. The bulk of research conducted using the LoU interview protocol has
assessed implementation of an innovation, which Hall et al. consider to be the primary role of the LoU instrument. Some of the findings included:

- Even when implementation of an innovation is mandated, there is variation in LoU and how an innovation is implemented (Clark, 1986; Dalton, 1990; Gwele, 1996; Sungkatavat, 1984).

- In many cases, teachers redefined or adjusted the innovation, so what was actually implemented differed significantly from what was intended (Clark, 1986; Dalton, 1990; Gwele, 1996; Stamos, 1996; Sungkatavat, 1984).

- Most teachers need two to three years' experience with an innovation to become good users, progressing beyond LoU III Mechanical Use (Dirksen, 2002; Dirksen & Tharp, 1997, 1999; Graber 2005; Marsh, 1987; Newhouse, 1999; Thornton & West, 1999).

Over the past few decades, concerns theory and the SoC and LoU constructs have been applied to a broad range of innovations and settings, including technology integration, teacher training, medical education, cooperative learning, distance education, and math and science curricula, and they continue to be relevant in understanding and supporting change. George et al. (2006) assert:

> Although innovations and their contexts may change, an understanding of the affective and behavioral dimensions as they affect individuals within the process (i.e., the human dimension of change) is as important today as when the model was first developed in the late 1970s. (p. 65)

**Conclusion**

This chapter presented a review of the research and literature regarding Unified English Braille (UEB), as well as a review of the literature contributing to the theoretical framework and research foundation of this study. A gap in the literature exists regarding UEB implementation; this study was designed to address the need for research into the transition to UEB in the United States. Change process theory provided the theoretical framework of the study, and the CBAM model was chosen because it provides valid and
reliable tools for diagnosing an implementation effort's progress at the level of the individual adopter. In the next chapter, the methodology of the study is described, including the population and sample, instrumentation, data collection procedures, and data analysis procedures.
CHAPTER 3

METHODOLOGY

A gap in the literature exists regarding the current status of the Unified English Braille (UEB) implementation process in the United States—the extent to which teachers of students with visual impairments (TVIs) have introduced UEB to their students and their concerns at this point in the transition—though the need for such information has been recognized in the field. Using change process theory as a theoretical framework, the researcher used the diagnostic tools of the Concerns-Based Adoption Model (CBAM) to provide a comprehensive description of TVIs' concerns about implementing UEB and the levels at which they are currently using UEB. Rather than describing this population solely in terms of how many TVIs are at each stage of concern or level of use, the study aimed to identify the breadth and nature of their concerns and the reasons why they are using or not using UEB; therefore, a case study methodology was used.

Yin (1994) stated case study research is appropriate when "a 'how' or 'why' question is being asked about a contemporary set of events over which the investigator has little or no control" (p. 9). He suggested a major strength of case study research is the opportunity to use multiple sources of evidence, which may include both quantitative and qualitative data. Creswell and Miller (2000) noted relying on multiple forms of evidence rather than a single incident or data point made findings more valid. They defined triangulation as "a validity procedure where researchers search for convergence among
multiple and different sources of information to form themes or categories in a study” (p. 126). Stake (1995) wrote of four types of triangulation based on the work of Denzin (1984): data source triangulation, investigator triangulation, theory triangulation, and methodology triangulation. In this study, the researcher utilized data source triangulation by comparing multiple embedded cases (participant case studies) and methodology triangulation by using quantitative data from a Likert-type scaled instrument along with qualitative data from open-ended written statements and focused interviews to provide a comprehensive status of the transition to UEB from the perspective of TVIs.

Population and Participants

The transition to UEB will affect many stakeholders; however, as stated in the delimitations section of Chapter 1, this study focused exclusively on the perceptions and behaviors of teachers of K-12 students with visual impairments. UEB training and implementation plans vary state-to-state; therefore, the participants in the study were limited to TVIs in one southern state who volunteered to participate in the study, making this a single-case embedded design. According to the director of the state materials center (the center through which TVIs obtain materials such as braille and large print texts for their students), there are approximately 76 TVIs in the state (R. King, personal communication, November 19, 2014). All TVIs in the state were invited to complete the online version of the Stages of Concern Questionnaire (SoCQ), and all those who completed the survey were asked to participate in an LoU interview.
Instrumentation

The researcher used two instruments to collect data: (1) a quantitative online Likert-type scaled questionnaire, which also contained demographic questions and open-ended questions, and (2) a qualitative focused interview protocol. The validity and reliability of the instruments were described in Chapter 2.

Stages of Concern (SoC)

Research Question 1: What are TVIs’ attitudes and beliefs toward the transition to UEB?

The first research question was addressed using the online Stages of Concern Questionnaire (SoCQ) (George et al., 2006; George et al., 2008; Hall et al., 1977). As described in detail in Chapter 2, the SoCQ is a quick-scoring written questionnaire. Respondents indicate the degree to which each of 35 statements related to an innovation is true for them at the present time by selecting a value on a Likert-type scale ranging from 0—Irrelevant to 7—Very true of me now.

In addition to the SoC statements, the online questionnaire contained demographic questions, including age, gender, race, highest degree earned, years teaching students with visual impairments, school setting (public, private, or residential), service delivery model (itinerant or based in one school), number of braille readers on caseload, UEB training received to date, and self-perception of knowledge/experience with UEB (non-user, novice, intermediate, or old hand).

The final question on the survey was the Open-Ended Concerns Statement: “When you think about the transition to UEB, what are you concerned about? (Do not say what you think others are concerned about, but only what concerns you now.) Please write in complete sentences, and please be frank.” An open-text box was provided so
respondents could answer in their own words with no limitation on length of text. The complete online survey is presented in Appendix D.

Levels of Use (LoU)

Research Question 2: How are TVIs currently using UEB?

The second research question was addressed using the LoU Focused Interview Protocol (Hall et al., 2006; Loucks et al., 1975). The overall design of the LoU interview is a branching format, with decision points guiding the interviewer through the sets of questions (see Appendix E). The interviewer supplements the required interview questions with appropriate, open-ended, probing questions to stimulate the interviewee to describe and provide examples of behaviors. Although many probing questions are formulated real-time in response to the interviewee's responses, Hall et al. (2006) recommend the interviewer prepare in advance some possible questions specific to the innovation aimed at determining whether the interviewee meets the requirements to be classified as a "user" and to better understand how the innovation is being used. The LoU Basic Interview Protocol is presented in Appendix F. The UEB-specific probing questions prepared in advance by the researcher are presented in Table 5.
Table 5. UEB-Specific Probing Interview Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ When did you start introducing UEB to your students?</td>
<td></td>
</tr>
<tr>
<td>✓ Have you had any beginning braille students since you started using UEB?</td>
<td></td>
</tr>
<tr>
<td>If yes: Did you start them in UEB? Are you also teaching them EBAE?</td>
<td></td>
</tr>
<tr>
<td>If no: Will you start beginning braille students in UEB? Will you also</td>
<td></td>
</tr>
<tr>
<td>teach them EBAE?</td>
<td></td>
</tr>
<tr>
<td>✓ Have you had any students who already knew braille since you started</td>
<td></td>
</tr>
<tr>
<td>using UEB?</td>
<td></td>
</tr>
<tr>
<td>If yes: Did you introduce changes sequentially, or all at once?</td>
<td></td>
</tr>
<tr>
<td>If no: Will you introduce changes sequentially to students who already</td>
<td></td>
</tr>
<tr>
<td>know braille, or all at once?</td>
<td></td>
</tr>
<tr>
<td>✓ What instructional materials are you using to teach UEB?</td>
<td></td>
</tr>
<tr>
<td>✓ Are you creating materials in UEB?</td>
<td></td>
</tr>
<tr>
<td>✓ Have you written goals and objectives about learning UEB in your</td>
<td></td>
</tr>
<tr>
<td>students' IEPs?</td>
<td></td>
</tr>
<tr>
<td>If yes: Did you have to add service time?</td>
<td></td>
</tr>
<tr>
<td>✓ When do you expect your students will start taking standardized tests</td>
<td></td>
</tr>
<tr>
<td>in UEB?</td>
<td></td>
</tr>
<tr>
<td>✓ Are you teaching your students UEB math? Why or why not?</td>
<td></td>
</tr>
<tr>
<td>✓ If you can remember, how did you learn the U.S. had adopted UEB?</td>
<td></td>
</tr>
<tr>
<td>✓ How do you typically learn about issues and trends in the field, such</td>
<td></td>
</tr>
<tr>
<td>as new technology or curriculum, new legislation, or updates to the code?</td>
<td></td>
</tr>
<tr>
<td>✓ Have you personally found learning UEB to be difficult?</td>
<td></td>
</tr>
<tr>
<td>✓ Have any of your students had issues with learning or using UEB?</td>
<td></td>
</tr>
<tr>
<td>✓ What do you think is the biggest obstacle to a smooth transition?</td>
<td></td>
</tr>
<tr>
<td>Is there anything you would recommend to overcome this obstacle?</td>
<td></td>
</tr>
</tbody>
</table>
Data Collection Procedure

Before data were collected, this study was approved through a formal Institutional Review Board (IRB) Human Use Committee review process (see Appendix G), and the online SoCQ was tested for accessibility using a screen reader program (JAWS). Pilot testing of the instruments was not required, because the SoCQ and the LoU Focused Interview protocol have been shown to be valid and reliable instruments, as described in detail in Chapter 2. Training is recommended for certification in LoU interviewing (Hall et al., 2006). Since no training sessions were scheduled by SEDL, the nonprofit education research and development organization that holds the copyright for CBAM materials, the researcher was trained individually by one of the original developers of CBAM, Gene Hall, Ph.D. Training consisted of reading the LoU manual (Hall et al., 2006), a study guide (Loucks et al., 1975), and additional training materials sent by Dr. Hall; completing and submitting written level and category rating exercises; rating audio recordings of LoU interviews; and submitting a practice LoU interview to Dr. Hall for evaluation. Upon satisfactory completion of the training, Dr. Hall granted the researcher certification as an LoU interviewer (G. Hall, personal communication, November 3, 2015).

All TVIs in the state were invited to complete the online SoCQ. On September 28, 2015 a request for participation was sent through three statewide email distribution lists: a list maintained by the director of the state materials center (the center through which TVIs obtain materials such as braille and large print texts for their students); a list maintained by the director of the state school for the visually impaired; and a list maintained by the outreach director of a state rehabilitation center for the blind. The
request included a direct link to the survey. The researcher sent follow-up reminder emails on October 5, 2015 and October 13, 2015. The request for participation and reminder emails are provided in Appendix H.

Upon submitting their questionnaire, all SoCQ respondents were automatically redirected to a UEB Interview Sign-Up page on the Survey Monkey website. A short message on the page thanked them for completing the questionnaire and asked them to leave contact information in the comment box if they were willing to participate in an interview about UEB at a later date. They were assured that their response could not be tied to their questionnaire and contact information would be used only for the purpose of setting up the interview and would never be shared.

The participants were contacted via email to arrange a convenient day and time for the LoU interview. The interviews were conducted by phone and followed the branching protocol (see Instrumentation above). All interviews were recorded and transcribed for analysis using the NoNotes iPhone recording app and transcription service. Use of the NoNotes transcription service was approved by the IRB (see Appendix G) upon receiving the following security and confidentiality information provided by the company:

- **Security**: NoNotes uses 128bit SSL Encryption. Passwords are doubled hashed and only internal NoNotes staff have access when transcription permission is granted. All servers are located in a class-A facility with climate control, retinal scan access, and around the clock security.

- **Confidentiality**: All transcriptionists have signed confidentiality agreements as part of their employment contracts, and a standard Non-Disclosure Agreement (NDA) is in place. (NoNotes, 2016)
The researcher reviewed all transcripts (114 pages total) against the original recordings (04:48:18 total) and made corrections as needed.

Ethical Considerations

Participation was voluntary, and the first page of the SoCQ contained the text of the Human Subjects Consent Form, along with a required confirmation checkbox to indicate the respondent understood the procedures and agreed to participate in the study (see Appendix D). All information collected from the instruments was held strictly confidential, and no information on TVIs’ participation or nonparticipation in the study was shared with school administrators. Each survey was assigned a unique identification label. No individually identifiable scores or statements with subjects’ identities were released, and pseudonyms were used in the final report.

Trustworthiness

Lincoln and Guba (1985) proposed that, although all studies must address the truth value, applicability, consistency, and neutrality of the findings, the conventional quantitative constructs (internal validity, external validity, reliability, and objectivity) were inappropriate for qualitative inquiry (Marshall & Rossman, 1989). They suggested the trustworthiness of qualitative studies should be evaluated in terms of the alternative constructs of credibility, transferability, dependability, and confirmability.

Credibility, the qualitative researcher’s equivalent to internal validity, is a construct that attempts to answer the questions: “How truthful are the particular findings of the study? By what criteria can we judge them?” (Marshall & Rossman, 1989, p. 144). Transferability, the qualitative researcher’s equivalent to external validity, is a construct that attempts to answer the question: “How applicable are these findings to another set or
group of people?” (Marshall & Rossman, 1989, p. 145). Dependability, the qualitative researcher’s equivalent to reliability, is a construct that attempts to answer the question: “How can we be reasonably sure that the findings would be replicated if the study were conducted with the same participants in the same context?” (Marshall & Rossman, 1989, p. 145). Confirmability, the qualitative researcher’s equivalent to internal objectivity, is a construct that attempts to answer the question: “How can we be sure the findings are reflective of the subjects and the inquiry itself rather than the product of the researcher’s biases and prejudices?” (Marshall & Rossman, 1989, p. 145). Together these constructs address the trustworthiness of a study.

Creswell and Miller (2000) suggested trustworthiness in a qualitative study should take into account the three “lenses” through which the study will be viewed: the lens of the researcher, the lens of study participants, and the lens of people external to the study (readers and reviewers). In this study, the researcher demonstrated trustworthiness in the following ways:

(1) Lens of the researcher – Yin (1994) recommended case study researchers rely on “multiple sources of evidence, with data needing to converge in a triangulating fashion” (p. 13). The researcher collected data using multiple instruments. In addition to determining TVIs’ stages of concern and levels of use based on SoCQ and LoU data, a thematic analysis was performed on the participants’ written Open-Ended Statements of Concern and the LoU transcripts to discover the breadth and nature of TVIs’ concerns and the reasons why they are using or not using UEB.

(2) Lens of study participants – The validity and reliability of the instruments, the quantitative SoCQ and the qualitative LoU interview, were described in Chapter 2. The
researcher combined data from these instruments with participants' own words (written and verbal quotes) to construct comprehensive individual participant profiles.

(3) Lens of the reader – The researcher provided an audit trail documenting all research decisions and activities along with a thick, rich description of the participants and themes in the study (Creswell & Miller, 2000). External reviewers can evaluate the documentation to form their own conclusions.

Data Analysis Procedure

Yin (1994) advised the case study researcher to think in terms of “analytic generalization” rather than “statistical generalization.” In analytic generalization, the theoretical framework may be used as “a template with which to compare the empirical results of the case study” (p. 31). In this study, the researcher used triangulation of data—between instruments and between participants—to provide a comprehensive description of TVIs’ concerns about implementing UEB and the levels at which they are currently using UEB. First, data from each instrument and each participant were analyzed separately, then all data were considered as a whole and compared to CBAM theory regarding the predicted stages of concern and levels of use of individuals in certain stages of an implementation process. The researcher also performed a thematic analysis to identify common areas of concern among TVIs implementing UEB.

SoCQ

The researcher scored the SoCQ by calculating raw scores for each of the seven stages, converting the raw scores to percentiles using a conversion chart, and plotting the results on the SoC Profile chart (George et al., 2006). Respondents complete the survey by rating the degree to which each of 35 statements is true for them by marking a number
on a 0-7 Likert-type scale next to each statement. Five statements correspond to each of the seven stages of concern. The raw score for each stage was calculated by summing the numerical values of the responses to the five statements on the instrument corresponding to that stage. Tables were provided to convert from raw stage scores to percentiles, and the resulting concerns profile was created by plotting the normed percentile values for each stage on a line graph (see Appendix I). A group concerns profile was created by adding the raw scores of group members for each stage and dividing by the number of group members. Those average raw scores were converted to percentiles using a conversion table.

The researcher created profiles for the entire cohort and for the following subgroups and individuals:

- user vs. nonuser comparison;
- training vs. no training comparison;
- individual profiles for LoU interview participants.

The SoCQ manual, *Measuring Implementation in Schools: The Stages of Concern Questionnaire* (George et al., 2006), detailed the methods by which SoCQ data can be interpreted. The researcher interpreted the data by identifying the highest stage score (Peak Stage Score Interpretation), examining both the highest and second highest scores (First and Second High Stage Score Interpretation), analyzing the complete profile (Profile Interpretation), and, when warranted for clarification, looking at individual item raw scores (Individual Item Analyses).
Open-Ended Concerns Statements

In evaluating an Open-Ended Concerns Statement, the goal is to develop a global picture of the respondent's concerns. By allowing respondents to state their concerns in their own words, the researcher can develop a better picture of the respondents' specific concerns, not just their stage(s) of concern (Hall & Hord, 2015; Hord et al., 2006; Newlove & Hall, 1976). The Open-Ended Concerns Statement also provides valuable context for interpreting SoCQ data and profiles. The researcher analyzed the content of each statement to determine the stage(s) of the concern expressed and then examined the statements individually and collectively to identify key themes.

LoU Interviews

Each transcribed LoU interview was rated using a rubric based on the interview protocol decision points and LoU definitions to determine the Level of Use in seven domains: Knowledge, Acquiring Information, Sharing, Assessing, Planning, Status Reporting, and Performing (Hall & Hord, 2015; Hord et al., 2006). From these category ratings, the overall LoU was determined. The LoU Rating Sheet is provided in Appendix J, and the scoring rubric, or LoU of the Innovation Chart, is provided in Appendix K. The researcher then examined the interview transcripts individually and collectively to identify key issues and emerging themes.

Thematic Analysis

In addition to determining TVIs' stages of concern and levels of use based on the survey and interview data, the researcher performed a manual content analysis of the written Open-Ended Concerns Statements and the LoU interview transcripts. Using systematic text analysis techniques based on analysis of words (word repetitions) and
careful reading of large blocks of text (compare and contrast), key themes were identified (Ryan & Bernard, 2003). The emerging themes were presented along with supporting quotes in order to consolidate the data from the group, subgroups, and individual embedded case studies, and to enhance understanding of the SoC and LoU data.

Summary

In this chapter, the methodology of the study was described, including the population and participants, instrumentation, data collection procedures, and data analysis procedures. In the next chapter, the findings of the study will be described, including demographic information on the participants, the results of the SoCQ survey, the participants’ written Open-Ended Concerns Statements, and the LoU focused interviews.
CHAPTER 4

RESULTS AND ANALYSIS

The purpose of this study was to provide a comprehensive description of (1) the concerns teachers of students with visual impairments (TVIs) have about implementing Unified English Braille (UEB), and (2) the levels at which they are currently using UEB. This purpose was achieved through the use of the research-based Stages of Concern (SoC) and Levels of Use (LoU) diagnostic tools of the Concerns-Based Adoption Model (CBAM) of educational change. The researcher gathered quantitative data from a Likert-type scaled instrument and qualitative data from open-ended written statements and focused interviews. Data were analyzed at various levels (groups, subgroups, and individuals) as described below:

1. Group data (the 34 TVIs who responded to the survey):
   a. Demographic description of the group from the survey
   b. SoCQ data for the group (Peak Stage Score Interpretation, First and Second High Stage Score Interpretation, and Profile Interpretation)
   c. Open-Ended Statements of Concern (manual content analysis of statements to determine level of concern(s) expressed and to identify key themes)

2. Subgroup data (subgroup based on the “state of the user”) as established from demographic questions on the survey:
   a. Comparison of concerns profiles based on self-designation (user vs. nonuser)
b. Comparison of concerns profiles based on formal training to date on UEB (training vs. no training)

3. Individual profiles of the 12 TVIs who participated in LoU interviews:
   a. Demographic description of each TVI based on survey data
   b. SoCQ data for each TVI (Peak Stage Score Interpretation, First and Second High Stage Score Interpretation, Profile Interpretation, and Individual Item Analyses)
   c. Open-Ended Statement of Concern from each TVI (manual content analysis to provide context to SoCQ data and profile interpretation)
   d. LoU rating for each TVI based on answers to LoU Basic Interview Protocol questions
   e. Contextual data for each TVI from “probing questions” in LoU interview (manual content analysis of transcripts to provide a description of each TVI and to identify key themes)

The results of these analyses are provided in this chapter.

Demographic Data

SoCQ data was collected between September 26 and October 14, 2015. At the end of the data collection period, 34 TVIs had completed the survey. Twelve of the 34 TVIs who completed the survey signed up to participate in an LoU interview. Evidence-based recommendations regarding nonprobabilistic sample sizes for interviews assume data saturation, the point at which no new information or themes emerge from the data, occurs within the first 12 interviews (Guest, Bunce, & Johnson, 2006); therefore, this number was considered satisfactory. LoU interviews were conducted between November 5 and November 20, 2015. The survey respondents’ demographic data and calculated peak stages of concern are compiled in Table 6.
<table>
<thead>
<tr>
<th>#</th>
<th>Gender</th>
<th>Age</th>
<th>Race</th>
<th>Highest degree earned</th>
<th>Years as TVI</th>
<th>Service delivery model</th>
<th>School setting(s)</th>
<th>Braille readers</th>
<th>Formal training on UEB to date*</th>
<th>User self-designation</th>
<th>Peak SoC</th>
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<td>Race</td>
<td>Highest degree earned</td>
<td>Years as TVI</td>
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<td>a, d</td>
<td>intermediate</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>M</td>
<td>30-39</td>
<td>A</td>
<td>M</td>
<td>3-4</td>
<td>itinerant</td>
<td>public</td>
<td>2</td>
<td>a</td>
<td>intermediate</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>F</td>
<td>50-59</td>
<td>W</td>
<td>B</td>
<td>1-2</td>
<td>one location</td>
<td>public</td>
<td>1</td>
<td>b, c, d</td>
<td>intermediate</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>F</td>
<td>40-49</td>
<td>W</td>
<td>M</td>
<td>11-20</td>
<td>itinerant</td>
<td>public</td>
<td>2</td>
<td>none</td>
<td>novice</td>
<td>5</td>
</tr>
<tr>
<td>26</td>
<td>F</td>
<td>40-49</td>
<td>W</td>
<td>M</td>
<td>3-4</td>
<td>itinerant</td>
<td>public</td>
<td>3</td>
<td>none</td>
<td>non-user</td>
<td>0</td>
</tr>
<tr>
<td>27</td>
<td>M</td>
<td>30-39</td>
<td>W</td>
<td>M</td>
<td>11-20</td>
<td>one location</td>
<td>public; outreach program</td>
<td>&gt; 10</td>
<td>a</td>
<td>old hand</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 6. (continued)

<table>
<thead>
<tr>
<th>#</th>
<th>Gender</th>
<th>Age</th>
<th>Race</th>
<th>Highest degree earned</th>
<th>Years as TVI</th>
<th>Service delivery model</th>
<th>School setting(s)</th>
<th>Braille readers</th>
<th>Formal training on UEB to date*</th>
<th>User self-designation</th>
<th>Peak SoC</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>F</td>
<td>50-59</td>
<td>W</td>
<td>M</td>
<td>21-30</td>
<td>itinerant</td>
<td>public</td>
<td>3</td>
<td>none</td>
<td>novice</td>
<td>0</td>
</tr>
<tr>
<td>29</td>
<td>F</td>
<td>70-79</td>
<td>W</td>
<td>M</td>
<td>5-10</td>
<td>itinerant</td>
<td>public; private</td>
<td>0</td>
<td>none</td>
<td>non-user</td>
<td>0</td>
</tr>
<tr>
<td>30</td>
<td>F</td>
<td>60-69</td>
<td>W</td>
<td>M</td>
<td>11-20</td>
<td>itinerant</td>
<td>public</td>
<td>0</td>
<td>none</td>
<td>novice</td>
<td>0</td>
</tr>
<tr>
<td>31</td>
<td>F</td>
<td>40-49</td>
<td>W</td>
<td>B</td>
<td>3-4</td>
<td>itinerant</td>
<td>public</td>
<td>4</td>
<td>d</td>
<td>intermediate</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>F</td>
<td>60-69</td>
<td>W</td>
<td>M</td>
<td>21-30</td>
<td>itinerant</td>
<td>public</td>
<td>4</td>
<td>a</td>
<td>novice</td>
<td>1</td>
</tr>
<tr>
<td>33</td>
<td>F</td>
<td>50-59</td>
<td>W</td>
<td>M</td>
<td>11-20</td>
<td>itinerant</td>
<td>public</td>
<td>2</td>
<td>none</td>
<td>non-user</td>
<td>0, 1</td>
</tr>
<tr>
<td>34</td>
<td>F</td>
<td>30-39</td>
<td>W</td>
<td>M</td>
<td>5-10</td>
<td>itinerant</td>
<td>public</td>
<td>2</td>
<td>b, c</td>
<td>intermediate</td>
<td>0</td>
</tr>
</tbody>
</table>

*Formal training on UEB to date: a. Live training session/workshop; b. Online training course; c. Correspondence course; d. College course
The 34 participants were primarily female (31) and white (29). The majority of participants had a Master’s degree (26) and were itinerant (24) in a public school setting (31). The age of the respondents varied, though it was notable that none of the TVIs who responded were under 30. Respondents were aged: 30–39 years (8), 40–49 years (7), 50–59 years (8), 60–69 years (10), 70–79 years (1). Experience teaching students with visual impairments varied: 1–2 years (3), 3–4 years (6), 5–10 years (12), 11–20 years (8), 21–30 years (4), over 30 years (1). Most TVIs who responded to the survey had between zero and six braille readers on their caseloads; two had > 10: 0 braille readers (4), 1 braille reader (6), 2 braille readers (10), 3 braille readers (3), 4 braille readers (5), 6 braille readers (4), > 10 braille readers (2). It was notable that in October 2015, less than three months from the official UEB implementation date in the United States, nearly a third of the TVIs who responded to the survey (10 of the 34 respondents) had received no formal training on UEB. The last question on the survey asked about respondents’ self-perception of knowledge/experience with UEB: “In your current use of UEB, do you consider yourself to be a: (non-user, novice, intermediate, or old hand)?” Most respondents considered themselves to be novice (14) or intermediate (12) users, with five non-users and three “old hands.”

Findings: Research Question 1—Stages of Concern

What are TVIs’ attitudes and beliefs toward the transition to UEB?

SoCQ

The group concerns profile for the 34 TVIs who completed the survey was calculated by taking the average of the raw scores for each stage and converting them to
normed percentiles using a conversion table. Figure 2 displays the group concerns profile in graphical form.

Figure 2. Group Concerns Profile: All Survey Respondents (34)

Profile Interpretation. The highest stage of concern for the group was Stage 0 Unconcerned (75%), and the second highest stage of concern was Stage 1 Informational (60%). Stage 2 Personal was the next highest stage of concern (57%), followed by Stage 5 Collaboration (44%). Stage 3 Management, Stage 4 Consequence, and Stage 6 Refocusing were all relatively low (≤ 30%). Concerns profiles are interpreted according to the SoC paragraph definitions previously presented in Table 3 (George et al., 2006). The group concerns profile for all the TVIs indicates that, overall, TVIs are not overly
concerned about transitioning to UEB (high Stage 0). In a non-user, a high Stage 0 indicates the respondent is unaware of the innovation or its requirements (it is not yet "on his or her radar"), while in a user, a high Stage 0 indicates the respondent is comfortable with the innovation or that he or she is more concerned with other priorities. The profile indicates TVIs are seeking more substantive information about UEB or about the transition (high Stage 1), and they have fairly intense concerns about how transitioning to UEB will affect them personally (high Stage 2). The spike at Stage 5 relative to the surrounding stages of concern indicates a desire to coordinate with others. It suggests TVIs would like to learn from what others know and are doing in regard to transitioning their students to UEB. The low stages indicate TVIs are not particularly concerned about the logistical aspects of the transition or of teaching UEB (low Stage 3), nor are they concerned about how it will affect students (low Stage 4). They do not appear to be concerned about alternatives that would potentially compete with UEB (low Stage 6).

Peak Stage Score Interpretation. Table 7 presents a distribution of peak stage scores within the group.

Table 7. Frequency of Highest Concerns Stage

<table>
<thead>
<tr>
<th>Stage of Concern</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of TVI Respondents</td>
<td>17</td>
<td>8</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Percent of TVI Respondents</td>
<td>50.0%</td>
<td>23.5%</td>
<td>8.8%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>17.6%</td>
<td>0.0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Stage 0 Unconcerned was the highest stage of concern for half of the TVIs who responded to the survey (50.0%). Stage 1 Informational was the highest stage of concern
for 23.5% of the TVIs, followed by Stage 5 Collaboration (17.6%), and Stage 2 Personal (8.8%). None of the TVIs who responded to the survey had peak scores at Stage 3 Management, Stage 4 Consequence, or Stage 6 Refocusing.

**First and Second High Stage Score Interpretation.** Because concerns of individuals change over time, usually in sequential stages, the second highest stage of concern is often adjacent to the highest stage of concern (George et al., 2006). Irregularities in this pattern give useful information about the group. Table 8 presents the percent distribution of the second highest stage of concern in relation to the first highest stage of concern for the TVIs who responded to the survey.

Table 8. First and Second High Stage Score Distribution

<table>
<thead>
<tr>
<th>Highest Stage of Concern</th>
<th>Second Highest Stage of Concern</th>
<th>Percentage of participants</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Unconcerned</td>
<td>0 1 12 18 0 29 0</td>
<td>50.0%</td>
<td>17</td>
</tr>
<tr>
<td>1 Informational</td>
<td>38 0 25 13 13 0 13</td>
<td>23.5%</td>
<td>8</td>
</tr>
<tr>
<td>2 Personal</td>
<td>33 67 0 0 0 0 0</td>
<td>8.8%</td>
<td>3</td>
</tr>
<tr>
<td>3 Management</td>
<td>0 0 0 0 0 0 0</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>4 Consequence</td>
<td>0 0 0 0 0 0 0</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>5 Collaboration</td>
<td>33 33 33 0 0 0 0</td>
<td>17.6%</td>
<td>6</td>
</tr>
<tr>
<td>6 Refocusing</td>
<td>0 0 0 0 0 0 0</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>

The peak stage of concern for 50% of all respondents was Stage 0 Unconcerned, and of those respondents, 41% had Stage 1 Informational as their second highest stage of concern, 12% had Stage 2 Personal as their second highest stage of concern, and 18% had Stage 3 Management as their second highest stage of concern. An irregularity in the
pattern (second highest stage of concern not adjacent to, or even near, peak stage of concern) appears with Stage 5 Collaboration concerns, which are the second highest stage of concern for 29% of TVIs whose peak stage of concern is Stage 0. For those whose peak stage of concern is Stage 5, the second highest stage of concern is evenly distributed between Stages 0, 1, and 2.

**Individual Item Analyses.** Individual item responses can provide valuable context for SoCQ interpretation. Table 9 presents the sum of the respondents’ raw scores for each question and for each stage.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage 0</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
<th>Stage 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q3</td>
<td>38</td>
<td>Q6</td>
<td>81</td>
<td>Q7</td>
<td>72</td>
<td>Q4</td>
<td>75</td>
</tr>
<tr>
<td>Q12</td>
<td>102</td>
<td>Q14</td>
<td>89</td>
<td>Q13</td>
<td>106</td>
<td>Q8</td>
<td>45</td>
</tr>
<tr>
<td>Q21</td>
<td>104</td>
<td>Q15</td>
<td>136</td>
<td>Q17</td>
<td>111</td>
<td>Q16</td>
<td>74</td>
</tr>
<tr>
<td>Q23</td>
<td>106</td>
<td>Q26</td>
<td>139</td>
<td>Q28</td>
<td>118</td>
<td>Q25</td>
<td>70</td>
</tr>
<tr>
<td>Q30</td>
<td>92</td>
<td>Q35</td>
<td>98</td>
<td>Q33</td>
<td>93</td>
<td>Q34</td>
<td>58</td>
</tr>
<tr>
<td>Raw Score Total</td>
<td>442</td>
<td>543</td>
<td>500</td>
<td>322</td>
<td>517</td>
<td>661</td>
<td>311</td>
</tr>
</tbody>
</table>

The highest raw score total was for Stage 5, followed by Stage 1, Stage 4, Stage 2, Stage 0, Stage 3, and Stage 6. The six individual statements rated highest overall by survey respondents (sum of raw scores > 135) were:
Stage 1:

Q15: I would like to know what resources are available if we decide to adopt UEB. (136)

Q26: I would like to know what the use of UEB will require in the immediate future. (139)

Stage 4:

Q24: I would like to excite my students about their part in this approach. (154)

Stage 5:

Q10: I would like to develop working relationships with both our faculty and outside faculty using UEB. (137)

Q27: I would like to coordinate my effort with others to maximize UEB's effects. (146)

Q29: I would like to know what other faculty are doing in this area. (146)

These high-scoring statements suggest TVIs would like to work with others in order to share information and resources on UEB and to excite their students about the transition.

Subgroup Analyses. A profile of a group as a whole is useful for displaying dominant high and low stages of concern of the entire group; however, because a group profile averages raw scores, extreme scores are dampened, and important information may be missed. For this reason, it is useful to examine subgroup distinctions. No outstanding relationships were found between stages of concern data and standard demographic variables such as gender, race, age, or years teaching students with visual impairments. The small sample size might obscure such relationships, but this finding correlates with data gathered over decades of CBAM research, which indicates "the state of the user appears to be significantly more important than standard demographic
variables in determining how the user will respond to an innovation” (George et al., 2006, p. 52). Figures 3 and 4 display comparisons based on the “state of the user”: Non-Users vs. Users and No Training vs. Training.
Figure 3. Profile Comparison: Non-User vs. User

Figure 4. Profile Comparison: No Training vs. Training
The profile comparisons (Non-Users vs. User and No Training vs. Training) are very similar; however, it should be noted that the subgroups are not equivalent (not all Non-Users received No Training, and not all Users received Training):

- Non-Users = 5 (4 with no training + 1 with training)
- No Training = 10 (4 non-users + 6 users)

The Non-User and No Training profiles indicate more intense concerns than the User and Training profiles at all stages except Stage 4 Consequence (16% in all profiles) and Stage 5 Collaboration (19% for Non-Users and 28% for No Training, compared to 52% for both Users and Training).

Open-Ended Concerns Statements

Open-Ended Concerns Statements may be useful in providing context for SoCQ interpretations (George et al., 2006; Hord et al., 2006; Newlove & Hall, 1976). Although 31 of the 34 TVIs who responded to the survey provided Open-Ended Concerns Statements, many were one sentence or less and, therefore, difficult to interpret. The researcher performed a manual content analysis of the written Open-Ended Concerns Statements to identify key themes. The survey respondents’ Open-Ended Concerns Statements are compiled in Appendix L and are labeled with the key theme(s) expressed, which will be discussed further in the Thematic Analysis section of this chapter.

The researcher identified the following key themes in TVIs’ concerns statements about the transition to UEB:

- Stage 0 Unconcerned
  - Seven TVIs expressed that they had no concern about the transition. (no concern)
• Stage 1 Informational
  o Four TVIs expressed concerns about their own training on UEB. (training–self/teacher)
  o Five TVIs expressed concerns about which math code(s) will be used. (math)

• Stage 2 Personal
  o Five TVIs expressed concerns about their own ability to learn and/or teach UEB. (ability–self/teacher)

• Stage 3 Management
  o Four TVIs expressed concerns about the time required to learn and/or teach UEB. (time)
  o Three TVIs expressed concerns about the lack of materials in UEB or about the confusion of having materials in both codes. (materials)

• Stage 4 Consequence
  o Seven TVIs expressed concerns about their students’ ability to learn UEB. (ability–student)

The Open-Ended Concerns Statements of the TVIs who participated in the LoU interviews will be discussed in greater detail in the Profiles of TVIs section.

Findings: Research Question 2–Levels of Use

To what extent are TVIs currently using UEB?

LoU Interviews

Twelve of the 34 TVIs who completed the survey participated in an LoU interview. The TVIs interviewed were primarily female (11), white (9), and had Master’s degrees (9). The age of the respondents varied: 30–39 years (3), 40–49 years (3), 50–59 years (1), 60–69 years (5). Experience teaching students with visual impairments also varied: 1–2 years (1), 3–4 years (4), 5–10 years (3), 11–20 years (2), 21–30 years (1), over 30 years (1). Seven of the 12 TVIs were certified to teach students with visual impairments; five were not. All the TVIs interviewed had at least one braille student on
their caseload: 1 braille reader (4), 2 braille readers (1), 3 braille readers (1), 4 braille readers (2), 6 braille readers (2), > 10 braille readers (2).

Most of the TVIs interviewed taught students in a public school setting (10). Six were itinerant, and six provided services in one school/location. The 12 TVIs represented nine school districts, a residential school for the blind, and a rehabilitation center for the blind. Two TVIs knew only UEB, so were not truly "transitioning"; 10 knew the old code prior to learning UEB. Two of the TVIs were visually impaired themselves.

The LoU interview participants’ pseudonyms, formal training on UEB to date, user self-designation, peak and second highest SoC as calculated from the survey, and LoU as rated from the interview are compiled in Table 10.
<table>
<thead>
<tr>
<th>#</th>
<th>Pseudonym</th>
<th>Formal training on UEB to date*</th>
<th>User self-designation</th>
<th>Peak SoC</th>
<th>SoC second highest peak</th>
<th>LoU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sunny</td>
<td>a</td>
<td>novice</td>
<td>1, 2</td>
<td>0</td>
<td>III</td>
</tr>
<tr>
<td>3</td>
<td>April</td>
<td>d</td>
<td>novice</td>
<td>0</td>
<td>3</td>
<td>III</td>
</tr>
<tr>
<td>5</td>
<td>Beth</td>
<td>a</td>
<td>intermediate</td>
<td>0</td>
<td>2</td>
<td>IVA</td>
</tr>
<tr>
<td>7</td>
<td>Amy</td>
<td>a, c</td>
<td>intermediate</td>
<td>5</td>
<td>0</td>
<td>IVA</td>
</tr>
<tr>
<td>9</td>
<td>Shelly</td>
<td>a</td>
<td>old hand</td>
<td>5</td>
<td>2</td>
<td>IVA</td>
</tr>
<tr>
<td>10</td>
<td>Natasha</td>
<td>d</td>
<td>intermediate</td>
<td>0</td>
<td>3</td>
<td>III</td>
</tr>
<tr>
<td>11</td>
<td>Tracy</td>
<td>a, other: webinar</td>
<td>intermediate</td>
<td>5</td>
<td>2</td>
<td>IVA</td>
</tr>
<tr>
<td>19</td>
<td>Michelle</td>
<td>a, b</td>
<td>intermediate</td>
<td>0</td>
<td>5</td>
<td>IVA</td>
</tr>
<tr>
<td>20</td>
<td>Lola</td>
<td>a, c</td>
<td>novice</td>
<td>1</td>
<td>4</td>
<td>III</td>
</tr>
<tr>
<td>21</td>
<td>Carol</td>
<td>c</td>
<td>novice</td>
<td>1</td>
<td>6</td>
<td>III</td>
</tr>
<tr>
<td>27</td>
<td>Stone</td>
<td>a</td>
<td>old hand</td>
<td>5</td>
<td>1</td>
<td>IVB</td>
</tr>
<tr>
<td>31</td>
<td>Karen</td>
<td>d</td>
<td>intermediate</td>
<td>1</td>
<td>3</td>
<td>III</td>
</tr>
</tbody>
</table>

* Formal training on UEB to date:
  a. Live training session/workshop
  b. Online training course
  c. Correspondence course
  d. College course
None of the LoU participants considered themselves to be non-users of UEB, and all of the LoU participants had received some type of formal training on UEB. Four of the TVIs described themselves as novice users, six were intermediate users, and two were “old hands.” The researcher rated the participants’ levels of use based on their answers to the questions in the LoU Basic Interview Protocol (see Appendix F). Table 11 presents a distribution of Levels of Use within the group of LoU interview participants, Table 12 presents a distribution of peak stages of concern, and Table 13 lists individual stages of concern percentile scores (peak score highlighted) as calculated from the SoCQ.

Table 11. Frequency of Level of Use

<table>
<thead>
<tr>
<th>Non-Users</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>0 I II III IVA IVB V VI Total</td>
<td></td>
</tr>
<tr>
<td>Number of TVIs</td>
<td>0 0 0 6 5 1 0 0 12</td>
</tr>
<tr>
<td>Percent of TVIs</td>
<td>0.0% 0.0% 0.0% 50.0% 41.7% 8.3% 0.0% 0.0% 100%</td>
</tr>
</tbody>
</table>

Table 12. Frequency of Highest Concerns Stage

<table>
<thead>
<tr>
<th>Stage of Concern</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of TVI Respondents</td>
<td>4</td>
<td>4*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Percent of TVI Respondents</td>
<td>33.3%</td>
<td>33.3%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>33.3%</td>
<td>0.0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LoU of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 III; 2 IVA</td>
</tr>
<tr>
<td>4 III</td>
</tr>
<tr>
<td>–</td>
</tr>
<tr>
<td>–</td>
</tr>
<tr>
<td>3 IVA; 1 IVB</td>
</tr>
<tr>
<td>–</td>
</tr>
<tr>
<td>12</td>
</tr>
</tbody>
</table>

* Note: When the percentile score for two stages is the same (Sunny had a tie for Peak Score at Stages 1 and 2), the "lowest" stage is considered to be the Peak Score in order to be conservative in seeing development of SoC and making interventions (G. Hall, personal communication, March 13, 2016).
Table 13. Listing of Individual Stages of Concern Percentile Scores

<table>
<thead>
<tr>
<th>LoU</th>
<th>#</th>
<th>Pseudonym</th>
<th>Unrel</th>
<th>Self</th>
<th>Task</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
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Peak concerns were evenly distributed between Stages 0, 1, and 5 (4 TVIs each). One TVI had a “tie” for peak concern between Stage 1 and Stage 2. All six TVIs at LoU III Mechanical Use had peak *unrelated* or *self* concerns. Two TVIs at LoU IVA Routine Use had peak *unrelated* concerns, and three TVIs at LoU IVA Routine Use had peak *impact* concerns. The one TVI at LoU IVB Refinement had peak *impact* concerns.
For each of the 12 LoU interview participants, the researcher combined data from the TVI's SoCQ, Open-Ended Concerns Statement, and LoU interview to create a case study profile. The case studies are presented in alphabetical order based on the pseudonym chosen.

Profiles of TVIs

Amy. Amy is an itinerant teacher in a public school district. This is her eleventh year teaching students with visual impairments. She has a Master’s degree, and she is certified in Visual Impairments by the state department of education. She has seven students on her caseload: two braille-only readers, four dual readers (braille and print), and one print-only reader. She is the only TVI in the school district.

Amy learned UEB through a two-day training workshop and a correspondence course. She considers herself an intermediate user of UEB. Figure 5 displays Amy’s concerns profile.
Figure 5. Amy’s Concerns Profile

Amy has a single peak high collaboration profile. Her highest stage of concern was Stage 5 Collaboration (80%), and her second highest stage of concern was Stage 0 Unconcerned (48%). Amy’s profile indicates she is interested in coordinating and cooperating with other TVIs to share resources and knowledge (high Stage 5). She is not overly concerned about the transition to UEB (midrange Stage 0), nor is she looking for information at this time (low Stage 1). She is personally comfortable with UEB (low Stage 2), and she is not concerned about the logistical aspects of teaching UEB (low Stage 3), nor is she concerned about its effect on her students (low stage 4). She is not considering major modifications to how she is teaching UEB (low Stage 6). Her low total raw score (72) places her in the 15th percentile based on the SoCQ conversion table (Hall et al., 1977) and indicates her concerns overall are relatively low.
Based on her interview, the researcher rated Amy’s use of UEB at Level IVA Routine Use, which is consistent with her self-designation as an intermediate (experienced) user and her high impact level concerns (Stage 5). She began teaching her students UEB in the 2014-2015 school year, and she considers transition to be essentially complete other than teaching some of the more “obscure symbols” that do not come up in her students’ everyday reading. She believes the way she has been teaching UEB works well, and she does not plan on making any major changes in the near future.

Amy spoke positively about the transition, noting strengths in UEB such as the elimination of confusing symbols and its close reflection of print, which allows students to see “exactly what their peers are seeing” (LoU, 11/30/15). She seemed to be taking a leadership role in the transition among her teaching peers, which may explain her high Stage 5 Collaboration score on the SoCQ. She indicated that, although she is the only TVI in her district, she speaks with colleagues at meetings and conferences. When referring to her colleagues’ status transitioning to UEB, she expressed concern, stating:

I either find teachers who have kind of been like me and just said, “Hey, let’s get this done; let’s start teaching it,” and then you have teachers who ... have no clue, and they’re still terrified, and that scares me, because they don’t even know it yet. (LoU, 11/30/15)

She added that she encourages these TVIs to get started, telling them she has not found learning UEB to be difficult and trying to emphasize “it’s not something to be scared of, but you definitely need to learn it” (LoU, 11/30/15).

Amy expressed concern about which math code(s) will be used. Her written Open-Ended Concerns Statement on the SoCQ read, “I am concerned that our state may adopt UEB MATH in the future, and I think Nemeth is more efficient for higher order math” (SoCQ, 9/26/15). She expanded on this in her LoU interview:
I will tell you that I’m apprehensive about UEB math. I think that a lot of people who do not know Nemeth well or who are scared to learn Nemeth are thinking, well, one code would be easier, but in truth, I’m thinking that they’re seeing it as one code, but it’s still the same amount of symbols, and from what I’m seeing is as they get higher and higher level math, that Nemeth just makes more sense to me, and I think that it would be quicker for kids who know the math. I see the UEB math thing as tedious. (LoU, 11/30/15)

Amy believes the biggest obstacles to a smooth transition to UEB in the United States are materials and standardized testing, due to the cost involved and the coordination required to phase out existing materials (old code) and start producing all new materials in UEB. She concluded, “I think it’s just going to take a while for the old code to ... get out of circulation” (LoU, 11/30/15).

April. April is an itinerant teacher in a public school district. This is her second year teaching students with visual impairments. She has a Master’s degree, and she was student teaching at the time of the interview, so she was not yet certified in Visual Impairments by the state department of education. She has four students on her caseload, all dual readers (braille and print).

April’s beginning braille course in her university VI program was taught in UEB, so UEB is all she knows. She considers herself a novice user of UEB. Figure 6 displays April’s concerns profile.
April’s highest stage of concern was Stage 0 Unconcerned (91%), and her second highest stage of concern was Stage 3 Management (65%); however, her Stages 1 Informational, 2 Personal, and 5 Collaboration were all within 2% of Stage 3. Her high unrelated (Stage 0) concerns indicate the transition to UEB is not her highest priority; perhaps because UEB is all she knows and is therefore not an “innovation” to her. This would correlate with her Open-Ended Concerns Statement, in which she wrote, “I have only learned UEB so the transition is not something I am concerned with now” (SoCQ 9/26/15). Her profile indicates she wants more information on UEB (high Stage 1), she has fairly intense personal concerns about her own abilities (high Stage 2), and she is concerned about the logistical aspects of teaching UEB (high Stage 3). She is not particularly concerned with how UEB will affect her students (low Stage 4), nor is she
considering major changes to how she is teaching UEB (low Stage 6), but she is interested in learning about what other TVIs were doing (high Stage 5).

Based on her interview, the researcher rated April’s use of UEB at Level III Mechanical Use, which is typical of an inexperienced user with high unrelated (Stage 0), self (Stages 1 and 2) and task (Stage 3) concerns. Her high impact concerns (Stage 5) are unusual for inexperienced users; however, they appear to be common for the TVIs who responded to the survey, as will be discussed in Chapter 5.

In her interview, April indicated all her students were beginning braille students and were learning braille in UEB. When asked whether she would be exposing her students to the old code as well since they will likely encounter materials created before UEB was implemented, she responded that she had made them aware they may come across differences, but they would “cross that bridge when we get to it” (LoU, 11/11/15). She expressed some concern over the fact that she was not familiar with the old code, saying, “I’m not even sure I know what the old retired contractions are that we talked about, so it’s not something that was focused on in my learning” (LoU, 11/11/15). She noted many of her colleagues who only know UEB were also apprehensive about encountering the old code and were afraid they might not notice the differences to point out to their students.

April believes that having materials in both codes is the biggest obstacle to a smooth transition to UEB in the United States, stating:

I think the biggest obstacle is going to be that so much of our material—especially coming from the standpoint of the teacher in using the resources that are already available—so much is not going to be in UEB. So for our new learners, having them understand what they might come across and what they might see, and having them ready to recognize that and to kind of move forward with it. I don’t
see it as being able to replace all of the old materials anytime soon, so I see that being kind of like a long-term transition almost. (LoU, 11/11/15)

She suggested offering workshops or courses to new TVIs to teach them what to expect and the differences between the old code and UEB, so they would be prepared to pass it on to their students.

**Beth.** Beth is a part-time teacher serving one student in a public school district. This is her sixth year teaching students with visual impairments. She has a Master's degree, and she is certified in Visual Impairments by the state department of education.

Beth was introduced to UEB in a two-day training workshop and in various sessions at professional conferences she has attended, and she considers herself an intermediate user of UEB. Figure 7 displays Beth’s concerns profile.

![Beth's Concerns Profile](image)

Figure 7. Beth’s Concerns Profile
Beth’s highest stage of concern was Stage 0 Unconcerned (75%), and her second highest stage of concern was Stage 2 Personal (63%). Her profile resembles a typical non-user profile with highest Stages 0, 1, and 2 and lowest Stages 4, 5, and 6 (George et al., 2006). Her profile indicates she is somewhat unconcerned about UEB or has other priorities (high Stage 0), but since her Stage 1 and Stage 2 concerns are also relatively high, she is likely interested in learning more about UEB and may have concerns about how the transition will affect her personally or about her own abilities in teaching UEB.

As mentioned previously, a negative one-two split (Stage 2 higher than Stage 1) can be a warning sign of resistance to the innovation (George et al., 2006); however, in this case, there is not a significant tailing up at Stage 6 (only 1%), so Beth does not appear to think there are better alternatives or that the old code is better than UEB.

Based on her interview, the researcher rated Beth’s use of UEB at Level IVA Routine Use. She believes the way she has been teaching UEB works well, and she does not plan on making any major changes in the near future. Level IVA is consistent with her self-designation as an intermediate user; however, as stated previously, her profile resembles that of a non-user. Her interview gives some clues to explain this inconsistency. She said that, after two years of braille instruction, her student was still at a low level and was not progressing very quickly; the student had not progressed beyond tracking, letters, and very early contractions before this year, so she had not yet learned anything that would be changed by UEB. Beth’s written Open-Ended Concerns Statement on the SoCQ read, “I am primarily concerned about the need to be able to read both UEB and the previous system and to accurately write UEB. This may be challenging for less capable students” (SoCQ, 9/26/15). Since Beth has only taught UEB
to one beginning braille student, she may have designated herself as an intermediate user based on her own knowledge of UEB and not her experience in teaching UEB. This may explain why her self concerns have not yet been resolved.

Beth rated no statements on the SoCQ below a “1” or above a “4,” which indicates she does not have intense concerns. George et al. (2006) warn a “flat line” response such as this one with no consistently high or low responses by stage may indicate a lack of differentiation between concerns statements. They explain, “Perhaps the respondent cannot differentiate among concerns because of general confusion about what the innovation is; or maybe the innovation is so far removed from the respondent’s life that it has little meaning” (p. 50). In Beth’s case, her interview suggests she simply is not concerned about UEB. She views it positively, saying the only disadvantages are that it is a change (“and change is hard”) and that so many existing materials are in the old code (LoU, 11/12/15). When telling others about UEB, Beth says she emphasizes the positives, saying UEB will make computer translation from print to braille and backtranslation from braille to print easier and will allow people in English-speaking countries to use the same code. She also points out that “it’s not a huge difference and not something that people need to be alarmed about” (LoU, 11/12/15). Beth believes people’s attitudes and anxiety about UEB are the biggest obstacles to a smooth transition. She suggested reaching out to adult braille readers and parents with information presented in a positive way, saying, “We want them to see this as a positive thing for students who are now in school. I think they’re the ones who are going to get the greatest positive results from this thing” (LoU, 11/12/15).
Carol. Carol is a part-time teacher serving one student in a public school district. She has taught students with visual impairments for 33 years. She has a Master’s degree, and she is certified in Visual Impairments by the state department of education.

Carol is learning UEB through an online training course for people seeking national certification in braille transcribing. She considers herself a novice user of UEB. Figure 8 displays Carol’s concerns profile.

Carol has a multi-peak concerns profile. Her highest stage of concern was Stage 1 Informational (75%), and her second highest stage of concern was Stage 6 Refocusing (69%). Her Stage 4 Consequence was also relatively high (63%). She appears to want more information on UEB or the transition (high Stage 1), and she has concerns about the effect it will have on her student (high Stage 4). She is less concerned with how the
transition to UEB will affect her personally (midrange Stage 2) and about working with others (midrange Stage 5), and she is not concerned with the logistical aspects of teaching UEB (low Stage 3). The pronounced (21%) tailing up at Stage 6 suggests Carol may be unsure of the value of UEB, which is reflected in two of the statements she rated highest (6 or 7):

Q35: I would like to know how Unified English Braille (UEB) is better than what we have now. (Stage 1) – “7”

Q31: I would like to determine how to supplement, enhance, or replace Unified English Braille (UEB). (Stage 6) – “6”

George et al. (2006) explain that a tailing up at Stage 6 may indicate the respondent has ideas he or she sees as having more merit than the proposed innovation. They advise that the Stage 6 tailing-up needs to be only 7–10 percentile points to be detectable in terms of the overall concerns of the individual and that “a more severe tailing-up should be heeded as an alarm” that the implementation is in jeopardy (p. 42).

The other statements Carol rated highest regarded her student, which provides context to her peak at Stage 4:

Q11: I am concerned about how Unified English Braille (UEB) affects students. (Stage 4) – “7”

Q24: I would like to excite my students about their part in Unified English Braille (UEB). (Stage 4) – “6”

Carol’s written Open-Ended Concerns Statement on the SoCQ also references concerns about the effect of the transition on her student:

My main concern is learning it myself so that I can teach it to others. I have slowly been implementing changes as I learn them to show my high school student who has been using BANA braille since she learned to read. I’m concerned for her reading it and using it. (SoCQ, 9/30/15)
In her interview, Carol indicated her student, a high schooler, is apprehensive about the transition. Carol has tried to reassure the student, telling her “she’s got the basic braille down, and these few changes are not going to hurt her, and they’re not going to be hard” (LoU, 11/11/15).

Based on her interview, the researcher rated Carol’s use of UEB at Level III Mechanical Use, since her focus appears to be on the short-term, day-to-day logistics of teaching UEB. This is consistent with her self-designation as a novice user and her high self concerns (high Stage 1; midrange Stage 2), which are expected in an inexperienced user. Her high impact concerns are atypical of an inexperienced user; however, Carol’s highest-rated statements on the SoCQ and statements from her interview clarify her concerns about her student (high Stage 4) and her uncertainty about the value of UEB (high Stage 6). When asked about the strengths of UEB, she was unable to list anything specific, saying only, “Well, I see it unifying... well, like in its description. It unifies English braille” (LoU, 11/11/15). The main weakness she identified was, “It’s just kind of hard to break old habits” (LoU, 11/11/15). She also mentioned she and her student miss some of the deleted braille contractions because of the space they saved in words.

Carol believes anxiety about the change and the amount of new information TVIs and students must learn are the biggest obstacles to a smooth transition to UEB in the United States. She suggested offering training in which changes are introduced “a bit at a time” instead of all at once, so as not to be so overwhelming (LoU, 11/11/15).

Karen: Karen is an itinerant teacher in a public school district. This is her third year teaching students with visual impairments. She has a Bachelor’s degree, and she is not certified in Visual Impairments by the state department of education. She is the only
TVI in a very large school district. She has 20 students with visual impairments on her caseload; four of them are learning braille, all dual readers (braille and print).

Like April, Karen learned UEB through the coursework in her university VI program. Her beginning braille course was taught in UEB, so that is all she knows. Karen considers herself an intermediate user of UEB. Figure 9 displays Karen’s concerns profile.

Karen has a multi-peak, though relatively flat, profile, with only 15% difference between the high and low of five of the seven stages. Karen’s highest stage of concern was Stage 1 Informational (43%), and her second highest stage of concern was Stage 3 Management (34%); however, her Stages 0 Unconcerned, 2 Personal, and 5 Collaboration were all within 6% of Stage 3. Karen’s raw score totals for stages had very
little variation. Her lowest raw stage score was 6 (Stage 6), and her highest was 15 (Stage 5). As mentioned in Beth's profile, George et al. (2006) consider "flat line" raw scores across stages a warning that the respondent may be unwilling or unable to differentiate between concerns because of general confusion about the innovation or because it is not affecting them personally. Karen's low total raw score (72) places her in the 15th percentile based on the SoCQ conversion table (Hall et al., 1977), indicating her concerns overall are relatively low. Her lack of overall concern about UEB may be due to the fact that, like April, it is all she knows and is therefore not really an "innovation" in the sense it is to TVIs who have been using the old code prior to the transition to UEB. She was unable to describe any strengths or weaknesses of UEB. In her Open-Ended Concerns Statement on the SoCQ, Karen wrote, "UEB is all I know because I am so new to this. I took Braille 1 and 2 which was given in UEB. I feel lucky!" (SoCQ, 10/7/15).

Based on her interview, the researcher rated Karen's use of UEB at Level III Mechanical Use, which correlates with her relatively high unrelated (Stage 0), self (Stages 1 and 2) and task (Stage 3 concerns). Although Karen considers herself an intermediate user of UEB, she is an inexperienced and uncertified TVI, and her focus appears to be on the day-to-day logistical activities of teaching UEB with little time for reflection. She mentioned frustration with scheduling, saying her braille students were not progressing as quickly as she would like, because she was only able to see them once a week. She also mentioned having difficulty motivating her students to learn braille, saying one student had "no interest whatsoever and doesn't want to do it" (LoU, 11/6/15). She also seemed unsure of effective instructional strategies and materials.
Regarding the curriculum or materials she used to teach her students UEB, Karen said:

I’m taking my notes, that’s how I kind of know what I do. I’m brand new at this; this is my third year. I just have been using my notes in Braille 1 and Braille 2, and I’m just going through it. (LoU, 11/6/15)

Karen later said she was using the same curriculum with her visually impaired students that was used in the braille course for sighted adults in her university VI program. When asked if she embossed the lessons (produced them in tactile braille) for her students, she replied that all her braille students were learning braille by sight, “just like I did,” and then she asked, “Is that totally wrong?” (LoU, 11/6/15). The concerns Karen expressed about materials, instructional methods, and student management correlate with three of her highest stages of concern: Stage 1 Informational, Stage 2 Personal, and Stage 3 Management.

Lola. Lola is a part-time teacher serving two students in a public school district. She has a Master’s degree, she is not certified in Visual Impairments by the state department of education, and she is a visually impaired braille reader herself. This is her third year teaching students with visual impairments, and she has one beginning braille student and one student who already knew the old code, so is “truly transitioning” to UEB (LoU, 11/9/15).

Lola learned UEB through a correspondence course and a training workshop. She considers herself a novice user of UEB. Figure 10 displays Lola’s concerns profile.
Lola has a multi-peak profile. Her highest stage of concern was Stage 1 Informational (93%), and her second highest stage of concern was Stage 4 Consequence (71%). Her profile indicates she has a strong desire for more information and resources on UEB (high Stage 1), and she has a great deal of concern about how the transition to UEB will affect her students (high Stage 4). The tailing up at Stage 6 can be a warning sign of resistance to the innovation; however, Lola's extremely high Stage 1 concerns and positive one-two split (Stage 1 significantly higher than Stage 2) indicate she is open to and interested in learning more about UEB.

Lola's written Open-Ended Concerns Statement on the SoCQ reveals intense concerns about materials, math, and the effect of the transition to UEB on students:

In transitioning to UEB, I am concerned about the confusion that is sure to come about since there will still be reading materials containing the old Braille code in
circulation. So then, the Braille reader will have to constantly remind him/herself which code is which. It will also be challenging to the student learning Braille for the very first time. Since these old Braille books are still in circulation, it will still be necessary for the student to be familiar with the old as well as the new Braille code (UEB). Another area that concerns me is that I have been told that each state will have the option of deciding whether to use UEB or Nemeth Code for Math and Science. Heaven help the child who moves from one state where one system is being used to another state where another system is being used. There must be uniformity. Otherwise, it is a set up for failure. (SoCQ, 9/30/15)

She voiced many of these same concerns in her interview when talking about the confusion of having materials in both codes, which she sees as the biggest weakness of UEB. She said:

The biggest weakness that I’ve seen is, it’s gonna be a long time before all the books that are out there catch up with UEB. For instance, my student who is just now learning braille, it’s going to be quite confusing to him when he gets a book that’s in English Braille and now UEB, and it’s just tragic because I know we’re not going to catch everything. I know he’s not going to remember everything, and so it’s going to be quite confusing to him when he’s using a book that’s in EBAE and not UEB. (LoU, 11/9/15)

Based on her interview, the researcher rated Lola’s use of UEB at Level III Mechanical Use. This is consistent with her self-designation as a novice user and her high self (Stages 1 and 2) concerns. Her high impact concerns (Stage 4) are unusual in a novice user; however, one possible explanation is the fact that she herself is a braille reader making the transition to UEB, so she likely identifies closely with her students. In her interview, she said she started losing her vision in 2009, and she had her first braille class in 2013, so she is having to transition to UEB as a relatively new braille user. When asked if she was finding it overwhelming, she replied, “Yeah, to have to start learning this all over, you know, not really all over again, but to pile on more on top of what I’m still trying to learn...” (LoU, 11/9/15).
Michelle. Michelle is a part-time teacher serving one student with a visual impairment in a public school district. She also teaches students without visual impairments in a private school. This is her third year teaching students with visual impairments. She has a Master’s degree, and she is not certified in Visual Impairments by the state department of education.

Michelle learned UEB through an online training course and a two-day training workshop. She began teaching her student UEB in the 2014-2015 school year, and she considers herself an intermediate user of UEB. Figure 11 displays Michelle’s concerns profile.

![Michelle's Concerns Profile](image)

Figure 11. Michelle’s Concerns Profile

Michelle has a high collaboration profile. Her highest stage of concern was Stage 0 Unconcerned (69%), and her second highest stage of concern was Stage 5.
Collaboration (64%). Her profile indicates she is not particularly concerned about UEB (high Stage 0), and she is interested in working with others to share experience, knowledge, and resources about UEB (high Stage 5). She may have some concerns about obtaining information and resources (midrange Stage 1) and about how the transition to UEB will affect her personally (midrange Stage 2), but she is not concerned about the logistical aspects of UEB instruction (low Stage 3) or the effect the transition to UEB will have on students (low Stage 4). She is not considering major modifications in how she is teaching (low Stage 6).

Her highest rated statements on the SoCQ correlate with her profile’s indication that she is most interested in coordinating with other TVIs to share resources:

Q5: I would like to help other faculty in their use of the UEB. (Stage 5) — “6”

Q10: I would like to develop working relationships with both our faculty and outside faculty using UEB. (Stage 5) — “7”

Q15: I would like to know what resources are available if we decide to adopt UEB. (Stage 1) — “6”

Michelle’s written Open-Ended Concerns Statement on the SoCQ gave context to her high Stage 0 Unconcerned and low Stage 4 Consequences. It read:

I am not concerned. My students are young so they are emerging braille readers and have not had a problem with any changes. I just address the changes as they appear in their reading and writing and we move on. Truly this is not a big deal and if we approach it as just simple changes our students will not have a problem. (SoCQ, 9/30/15)

Based on her interview, the researcher rated Michelle’s use of UEB at Level IVA Routine Use, which is typical of an experienced user and correlates with her high impact (Stage 5) concerns. She started brailling in UEB all materials for her student during the
2014-2015 school year, and she considers the transition to be essentially complete at this point:

We’ve already made the change, so everything that the student gets is in UEB braille, and we’ll just continue to do that. I don’t even think that the student realizes that the code that she... well, the code that the student is reading is just all the student knows. (LoU, 11/15/15)

Although her student had no trouble with the transition, Michelle acknowledges it might have been different with a more advanced braille user, saying, “I imagine for others who have more students and various ages, I mean, I can see where it could be more of a challenge” (LoU, 11/15/15).

Michelle believes the biggest obstacles to a smooth transition to UEB in the United States are fear of change and attitudes about UEB. She recommends teachers project a positive attitude toward UEB, saying:

I think it’s real important that everybody who is teaching it is just as positive as possible because, you know, we’re going to pass that on, and really, it’s not that difficult, so if we approach it that way, then I think the student won’t have a... I think that they’ll be fine. (LoU, 11/15/15)

Natasha. Natasha is a teacher in a resource room in a public school. She serves six students with visual impairments and 12 students who do not have visual impairments. This is her fifth year teaching students with visual impairments. She has a Bachelor’s degree, and she is certified in Visual Impairments by the state department of education.

Natasha learned UEB through the advanced braille course in her university VI program. She began teaching her students UEB in the 2014-2015 school year, and she considers herself an intermediate user of UEB. Figure 12 displays Natasha’s concerns profile.
Natasha has a multi-peak profile. Her highest stage of concern was Stage 0 Unconcerned (75%), and her second highest stage of concern was Stage 3 Management (69%). She also had a significant peak at Stage 5 Collaboration (59%). Her profile indicates that, while she is not overly concerned about the transition (high Stage 0), she has some concerns about managing the day-to-day logistics of teaching UEB (high Stage 3), and she is interested in working with others to share information and resources (high Stage 5). She is not concerned about the effect the transition to UEB will have on her students (low Stage 4), as corroborated by her written Open-Ended Concerns Statement on the SoCQ:

I am not concern[ed] about the use of UEB. My students either are learning UEB from the start if a new braille learner or have learned both old braille and new UEB if they have been receiving services for longer than one year. (SoCQ, 9/28/15)
The statements Natasha rated highest on the SoCQ were

Q4: I am concerned about not having enough time to organize myself each day. (Stage 3) – “6”

Q12: I am not concerned about UEB at this time. (Stage 0) – “6”

Q24: I would like to excite my students about their part in this approach. (Stage 4) – “7”

Q27: I would like to coordinate my effort with others to maximize UEB’s effects. (Stage 5) – “6”

These highly-rated statements indicate Natasha is not overly concerned about the transition to UEB; however, she would like to coordinate with other TVIs to share resources and information that might help her lessen some logistical concerns and allow her to focus on her students. She is not considering major modifications to how she is teaching UEB (low Stage 6).

Based on her interview, the researcher rated Natasha’s use of UEB at Level III Mechanical Use. This is typical of a user with high task (Stage 3) concerns. She gives context in her interview, repeatedly mentioning her frustration with the lack of materials:

“My biggest challenge with it is not all materials have been transitioned to UEB. I mean even stuff I’ve downloaded. It’s not all UEB yet.”

“I’ve ordered textbooks three months ago in braille. I’m still waiting for them. I’m hoping they’ll be in UEB since they’re being made new, but I don’t know.”

“I think my biggest obstacle is things that are out there are not all in UEB yet. I don’t know what I’m ordering. Is it going to be in UEB? I don’t know about state assessments…”

“If you’ve got to order materials, they don’t even clarify whether it is UEB. I had to call on some things and ask.” (LoU, 11/5/15)

Natasha believes this difficulty in obtaining the right materials is the biggest obstacle to a smooth transition to UEB in the Unites States.
Shelly. Shelly is a part-time teacher serving one student with a visual impairment in a public school district. This is her third year teaching students with visual impairments. She has a Master’s degree, and she is dual-certified in Visual Impairments and Orientation and Mobility (cane travel instruction). In addition to her one braille student, she teaches cane travel to 13 students in three school districts.

Shelly learned UEB through training workshops. She began teaching her student UEB in the 2014-2015 school year, and she considers herself an “old hand” user of UEB. Figure 13 displays Shelly’s concerns profile.

Figure 13. Shelly’s Concerns Profile

Shelly has a multi-peak profile. Her highest stage of concern was Stage 5 Collaboration (93%), and her second highest stage of concern was Stage 2 Personal (89%). Stage 1 Informational was also high (84%). Her profile shows very high highs.
(Stages 1, 2, and 5), and very low lows (Stages 0, 3, and 6). Such extreme responses, may suggest she is extremely anxious about certain aspects of the transition (George et al., 2006). Her profile indicates she considers the transition to UEB to be a high priority (low Stage 0), but she is not concerned about the logistical aspects of teaching UEB to her student (low Stage 3). She wants more information (high Stage 1) and to coordinate with other TVIs (high Stage 5), and she has concerns about how the transition will affect her personally (high Stage 2). She is not considering major modifications to how she is teaching UEB (low Stage 6).

Based on her interview, the researcher rated Shelly’s use of UEB at Level IVA Routine Use. This is consistent with her self-designation as an “old hand” user with high impact (Stage 5) concerns; however, her high self (Stages 1 and 2) concerns and the negative one-two split (Stage 2 higher than Stage 1) are unusual at this level of use. It was difficult to gain context from Shelly’s individual item responses due to her extreme response tendency. Out of the 35 statements, she rated 13 statements as 7—Very true of me now, and 16 statements at 1—Not true of me now. She gave no response to the Open-Ended Concerns Statement, and her interview was the shortest of all TVIs interviewed (11:07), with many two-word answers and little elaboration. This may indicate an unwillingness to be open about her concerns or a lack of understanding about transition issues. She was unable to name any strengths or weaknesses of UEB, which seemed unusual for an “old hand.”

When asked where she saw herself right now in relation to transitioning her student to UEB, Shelly said:

We have already made the transition, so anything that I have produced or I introduce to the student is all UEB braille, and then when we get materials from
other sources, as we run across those changes that are not present, it's just a constant reminder that, you know, she'll see things that are in the old braille code and the UEB code. (LoU, 11/13/15)

She said she did not find UEB difficult to learn for herself or for her student, and she tells others UEB is "not a big deal for the kids," though the reading comes more naturally than the writing (LoU, 11/13/15). The biggest obstacle she saw to a smooth transition to UEB in the United States was the issue of which math code(s) will be used. She recommended research regarding math codes:

Perhaps someone should do a study on the use of UEB math and Nemeth math and compare the two, the amount of time it takes to learn UEB math and Nemeth math or use it. Looking at the whole spectrum for like from pre-K to 12th grade to college, and really getting an idea of what UEB math looks like throughout all those grades and what Nemeth math looks like or how it affects students or how they'll adjust to the different codes. (LoU, 11/13/15)

She is teaching her student Nemeth only for math.

**Stone.** Stone is a Director of Youth Services at a rehabilitation center for the blind. He works with students with visual impairments throughout the year as a consultant, and he coordinates the center's summer programs for children. He also provides outreach and technical assistance to other educators in the field. This is his 18th year in the blindness field, and he is visually impaired himself. He has a Master’s degree, he is certified in Visual Impairments by the state department of education, and he is a lifelong braille reader. Stone was introduced to UEB through a two-day training workshop and various sessions at professional meetings and conferences. He considers himself an "old hand" user of UEB. Figure 14 displays Stone’s concerns profile.
Stone has a multi-peak profile. His highest stage of concern was Stage 5 Collaboration (98%), and his second highest stage of concern was Stage 1 Informational (90%). His profile indicates he is not particularly concerned with the transition to UEB (high Stage 0); however, he is interested in obtaining more information and resources on UEB (high Stage 1) and coordinating with TVIs regarding its use (high Stage 5). Because Stone provides outreach and technical assistance to other educators in the field as part of his job, the high Stage 5 is not surprising. A high Stage 5 is typical of administrators and leaders (George et al., 2006).

Based on his interview, the researcher rated Stone’s use of UEB at Level IVB Refinement. He is planning what he considers a major modification to how he has been teaching UEB—adding a significant technology component to instruction. He said that
by incorporating this "digital approach" to teaching UEB, he will be "utilizing that intersection of braille and technology more than we have in the past" (LoU, 11/11/15).

His Level IVB Refinement rating is consistent with his self-designation as an "old hand" user with high impact (Stage 5) concerns. He gave context for his high self (Stages 1) concerns in his interview, explaining he continually sought out information to pass on to other professionals in the field. He said:

There's never a time ... where we just sit back and say "Well, we know all we need to know." We're always looking for additional resources for ourselves to learn more as well as to pass on to educators in the field. (LoU, 11/11/15)

Stone was very positive about UEB, citing such strengths as the elimination of certain signs that were ambiguous and confusing, the improvement in translation and backtranslation capabilities using software and technology, and the fact UEB better represents print by providing multiple methods of adding emphasis. One weakness he mentioned was the requirement to use a letter sign in some cases even when the context makes it unnecessary, but he noted this was really a "nitpicky" complaint saying, "when you look at the overall strength of the code, the weakness that I find is very minor" (LoU, 11/11/15).

Stone was concerned over the issue of which math code(s) would be used. In his Open-Ended Concerns Statement, he said:

I am concerned that UEB math will supplant Nemeth here in the U.S. UEB is necessary for the evolving literary climate but should not serve as a substitute to the tried and true flexibility and power of Nemeth for mathematics and science texts. (SoCQ, 10/6/15)

In his interview, Stone explained he believed the Nemeth code was more efficient for math and science notation. He noted UEB math uses more space and is unfamiliar to students and TVIs, and he pointed out that a braille proficiency exam has not been
developed for braille transcribers and TVIs, saying, “there is no accountability with regards to UEB math proficiency, so we have just chosen not to utilize UEB math” (LoU 11/11/15).

Stone believes the biggest obstacle to a smooth transition is a “lack of informational awareness” among some TVIs in the field. He said he has met some TVIs “who didn’t even know the change was going to take place,” and others who were not being proactive in learning about UEB and the transition “out of fear, or perceived lack of time, or perceived lack of resources” (LoU, 11/11/15). He suggested regional training workshops be offered to reach all the TVIs in the state and get them the information they need to successfully transition their students to UEB.

**Sunny.** Sunny is an itinerant teacher in a public school district. This is her 23rd year teaching students with visual impairments. She has a Bachelor’s degree, and she is not certified in Visual Impairments by the state department of education. She has 14 students on her caseload, including three braille readers.

Sunny was introduced to UEB through a two-day training workshop, and she considers herself a novice user of UEB. Figure 15 displays Sunny’s concerns profile.
Sunny’s highest stages of concern were Stage 1 Informational (96%) and Stage 2 Personal (96%), and her second highest stage of concern was Stage 0 Unconcerned (94%). Her Stage 3 Management and Stage 6 Refocusing concerns were also high. Her profile resembles that of a typical non-user (highest Stages 0, 1, and 2, and a lower Stages 4, 5, and 6) (George et al., 2006), except for the extreme (26%) tailing up at Stage 6, which may indicate resistance to UEB.

Sunny had the highest total raw score of all 34 TVIs who responded to the survey. Her high total raw score (177) places her in the 98th percentile based on the SoCQ conversion table (Hall et al., 1977) and indicates her concerns overall are relatively high, as can be seen in her concerns profile. She rated 17 of the 35 statements on the SoCQ as 7—*Very true of me now*. Her raw score at Stage 2 is more than double the group average.
Sunny is very negative about the transition to UEB. Her interview confirmed she does not see the value in the new code:

The real, real young preschoolers, kindergartners, even first grade, they’ll transition beautifully. There’s not going to be major problems there. But the older ones that have learned it one way and now they’re having to learn another thing? I don’t really see how it’s going to benefit the American people. I don’t. And I really think it’s a big mistake in doing this, because how many people out there will never learn the UEB code for whatever reasons, and they’re going to become more and more illiterate if they can’t read it in braille, and what, are they going to become audio listeners or what? They’re going to eventually lose their skills. (LoU, 11/7/15)

Based on her interview, the researcher rated Sunny’s use of UEB at Level III Mechanical Use. She is struggling with the logistics of how to teach UEB to students. Her written Open-Ended Concerns Statement on the SoCQ said, “I am mostly concerned about teaching the old code and the new code to those who have not mastered the old code as of yet” (SoCQ, 9/26/15). She indicated she is looking to other TVIs for information and support, saying, “I try to get in contact with different people to see what they are doing and see, well, maybe try it that way, and see how it benefits my students” (LoU, 11/7/15).

Sunny indicated both she and her students have found learning UEB to be difficult. Her final statement summed up her feelings about the change: “I agree with the kids—it wasn’t broke, so why are they changing it?” (LoU, 11/7/15).

Tracy. Tracy is a braille teacher in a residential school for the blind. This is her eighth year teaching students with visual impairments. She has a Master’s degree, and
she is certified by the state department of education in Visual Impairments. She estimates she provides direct instruction in braille to over 20 students. She also works on a consultative basis with other students and the staff at the school.

Tracy was introduced to UEB through a webinar and a two-day training workshop, and she considers herself an intermediate user of UEB. Figure 16 displays Tracy’s concerns profile.

![Tracy's Concerns Profile](image)

**Figure 16. Tracy’s Concerns Profile**

Tracy has a multi-peak profile. Her highest stage of concern was Stage 5 Collaboration (97%), and her second highest stage of concern was Stage 2 Personal (72%). Her profile indicates she is highly concerned about coordinating with other TVIs (high Stage 5), and her personal concerns about how the transition to UEB will affect her may outweigh her desire for more information (negative one-two split with Stage 2
significantly higher than Stage 1). It should be noted; however, that, in an experienced user, a low Stage 1 may indicate the user is very knowledgeable about the innovation and does not require more information at this time (George et al., 2006). She is not considering major modifications to how she is teaching UEB (low Stage 6).

Based on her interview, the researcher rated Tracy’s use of UEB at Level IVA Routine Use, which is consistent with her self-designation as an intermediate user and her high impact (Stage 5) concerns. Because Tracy provides consultative support to all the students and teachers at the residential school as part of her job, the high Stage 5 is not surprising. As noted in Stone’s profile, a high Stage 5 is typical of administrators and leaders (George et al., 2006). Her high self (Stage 2) concerns are unusual for an experienced user at this level of use, but may be caused by the pressure she feels to provide more or better support to the other teachers at the school. Her written Open-Ended Concerns Statement on the SoCQ said:

I am concerned that the classroom teachers do not have time to help the braille readers transition to UEB and that they do not know how to teach UEB to the students. Teachers use me for a reference and I have led introductions to it, but I think at our school, we need to make time to learn ways to teach it within the subjects a teacher teaches. (SoCQ, 9/28/15)

Her raw scores support this idea. Four of the six statements on the SoCQ that she rated as 7—Very true of me at this time were Stage 5 statements that indicate a desire to help other TVIs, including:

Q5: I would like to help other faculty in their use of the UEB.

Q18: I would like to familiarize other departments or people with the progress of this new approach.

When asked about the strengths and weaknesses of UEB, Tracy mentioned a strength is the new typeform symbols in UEB that distinguish between italics, bold, and
underline and make the braille more closely represent print. The biggest weakness she saw was the issue of having materials in both codes. She said:

The bigger challenge is working with beginners I think, and having them understand what the code is now as well as having to teach them some of the signs to be aware of and also to teach them that sometimes they’re not changing. I think that’s been one of the difficulties for all of the students across the board—not to assume because you have certain contractions that you’re not using anymore, or new punctuation that is changing, not every sign in the old braille code is changing. (LoU, 11/10/15)

She recommended universities train TVIs in instructional strategies for helping students transition to UEB, saying:

I think now the next step for the universities and the schools for the TVIs will be methodology to help us know how to transition and get a lot of different teaching techniques so we can have a smoother transition, so it’s not just in pieces. (LoU, 11/10/15)

**Thematic Analysis**

The researcher performed a manual content analysis of the written Open-Ended Concerns Statements and the LoU interview transcripts to identify key themes. Themes were identified in the areas of: (1) TVIs’ concerns about UEB and the transition, (2) their perceived obstacles to the transition, and (3) the status of the implementation effort based on their current usage of UEB.

**Concerns About UEB and the Transition**

The final question on the SoCQ survey asked: “When you think about the transition to UEB, what are you concerned about? (Do not say what you think others are concerned about, but only what concerns you now.) Please write in complete sentences, and please be frank.” An open-text box was provided so respondents could answer in their own words with no limitation on length of text. The survey respondents’ Open-
Ended Concerns Statements are compiled in Appendix L. The key concerns expressed in those statements and in the LoU interviews are addressed below.

Unconcerned. Some TVIs expressed that they were not concerned about the transition to UEB. As discussed in their profiles, April and Karen stated they were not concerned about UEB because they only recently learned braille, and their beginning braille courses were taught in UEB. They were not “transitioning,” and UEB was not really an “innovation” to them in the sense it was to TVIs who had been using the old code prior to the transition to UEB. Michelle and Natasha were not concerned because they were teaching beginning braille students. The students were either being taught UEB from the start or were not advanced enough to be ingrained in the old code, so the transition was essentially transparent to them. Some TVIs expressed in their Open-Ended Concerns Statements that they were not concerned because they agreed with the changes that were made:

“I have no concerns. I think the UEB code changes were necessary and make a lot of sense.”

“There are no concerns at this time. The format and grouping of the word signs, contractions, etc. should aid the student(s) in comprehending the codes. Therefore, the transition should be smooth.”

“I am not leery of the changes. They seem to make sense and clarify items that were confusing.”

Informational Concerns. Some TVIs expressed concern about training—the need for more information on the changes to the code and instructional strategies for teaching UEB. Other TVIs expressed concerns about which code(s) will be used for mathematical and science notation. (Note: The researcher is categorizing concerns about the math code as Informational, because at the current time it is a “what if” concern: “What if the state
adopts to UEB math?” The concern is in relation to a lack of information. If the decision is made by the state to switch to UEB math, Personal, Management, and Consequence concerns will likely spike for these teachers.)

Tracy referenced the need for training on instructional strategies in her Open-Ended Concerns Statement, saying she was concerned the classroom teachers at her school, a residential school for the blind, did not know how to teach UEB to their students. In their Open-Ended Concerns Statements Amy, Lola, and Stone all expressed concern about which math code(s) will be used. Amy and Stone both said they felt Nemeth was a better code for math. Amy said it was “more efficient for higher order math,” and Stone said UEB math should not “serve as a substitute to the tried and true flexibility and power of Nemeth for mathematics and science texts” (SoCQ, 9/26/15; SoCQ, 10/6/15). Lola was concerned that having each state decide which code(s) to use for math would cause confusion and logistical problems: “Heaven help the child who moves from one state where one system is being used to another state where another system is being used. There must be uniformity. Otherwise, it is a set up for failure” (SoCQ, 9/30/15). Other Open-Ended Concerns Statements expressing informational concerns included:

“That TVIs throughout the state will not be exposed to proper training, thus not allowing for proper training of students.”

“I feel that there should have been more information/workshops concerning the changes prior to the implementation of UEB. I always feel that we have to ‘catch-up’ to the changes.”

“My biggest issue is the phasing out of literary braille. I would like to know if there will be a way to know when I can stop du[al] teaching literary reading AND UEB reading/writing.”

“UEB math!!!”
“As long as [my state] keeps Nemeth for math, I have no concerns.”

**Personal Concerns.** Some TVIs expressed concerns about their own abilities to learn and teach the new code. Carol said her main concern was learning it herself so she can teach it to others. Other Open-Ended Concerns Statements expressing personal concerns included:

“**My ability to make the transition.**”

“I don’t have any concerns other than just making sure I am accurate in my teaching of UEB.”

“I don’t know UEB and I don’t have time to learn something new.”

“Being able to remember all the changes.”

**Management Concerns.** Some TVIs expressed concerns about the logistical aspects of teaching UEB, including: the time required to learn and teach UEB, how to balance it with other responsibilities, and the availability of resources. In her Open-Ended Concerns Statement, Tracy said she was concerned the classroom teachers at her school, a residential school for the blind, did not have time to help their braille students transition to UEB. Other Open-Ended Concerns Statements expressing management concerns included:

“My only concern is the timely availability of UEB materials.”

“It is almost as if I have to teach three codes on top of Nemeth, music braille, and all of the extended core curriculum.”

“Finding materials that have been converted [is a concern], too, but I can produce them or talk to my students when they find differences.”

“I am concerned about not having enough time to learn UEB and meet the needs of my students at the same time.”

“The amount of time it will take to learn UEB is a concern.”
"Changing the resources readily available that I already have."

Consequence Concerns. Some TVIs expressed concerns about how the transition to UEB might affect their students, who will have to know both old and new codes as they will encounter materials in the old code for years to come. In their Open-Ended Concerns Statements, Sunny and Beth mentioned that the transition may be especially hard for those students who have not yet mastered the old code or who are less capable. Carol was concerned about her high school student who had been using the old code since she learned to read. Lola expressed concern for both experienced and beginning braille readers, saying:

In transitioning to UEB, I am concerned about the confusion that is sure to come about since there will still be reading materials containing the old Braille code in circulation. So then, the Braille reader will have to constantly remind him/herself which code is which. It will also be challenging to the student learning Braille for the very first time. Since these old Braille books are still in circulation, it will still be necessary for the student to be familiar with the old as well as the new Braille code (UEB). (SoCQ, 9/30/15)

Other Open-Ended Concerns Statements expressing consequence concerns included:

"Older materials that do not have the UEB code and making sure the student is up to date with both codes."

"I am concerned about the transition my students will have to make when UEB is used in their textbooks."

"Students using textbooks brailed before the transition to UEB, while learning UEB."

Perceived Obstacles to the Transition.

The final UEB-specific probing questions asked in the LoU interviews were:

"What do you think is the biggest obstacle to a smooth transition? Is there anything that you would recommend to overcome this obstacle?" Many of the LoU participants’
answers to these questions were described in their individual profiles; the following is a cross-case analysis of those answers to identify the key themes expressed. Several of the key themes expressed as perceived obstacles to a smooth transition were also expressed in the preceding section as Informational and Management concerns: training, math, and materials. Two new themes emerged: attitudes and assessments.

**Training.** When discussing obstacles to a smooth transition to UEB, Carol, Stone, and Tracy all mentioned a need for training. Carol thought the changes to the code were too extensive for TVIs to absorb at once. She suggested training sessions in which changes are introduced “just a bit at a time” (LoU, 11/11/15). Stone was afraid some TVIs were not being proactive in learning about the changes, a situation he described as a “lack of informational awareness” (LoU, 11/11/15). He suggested regional trainings for TVIs—taking the training to them. Tracy said, “I think the biggest obstacle is just the amount of information, figuring out how much we teach, and also giving support to our TVIs who are itinerant” (LoU, 11/10/15). She also thought regional workshops were important to reach all the teachers in the state.

**Math.** Shelly said the biggest obstacle to a smooth transition was “in determining what code will be used for math” (LoU, 11/13/15). She suggested research comparing UEB and Nemeth—how long it takes to learn each code, what math looks like in each code at various levels (pre-K to 12), and whether the code used has an effect on student outcomes. Amy and Stone spoke of the math issue, but they did not reference it in their answers to the question of the biggest obstacle to a smooth transition. Tracy mentioned math when speaking of obstacles to a smooth transition; however, she did not consider it
to be an obstacle, because she believed her state had already made the decision to continue using the Nemeth code for math and science notation.

**Materials.** Amy, April, Lola, Natasha, and Sunny believed having materials in both the old code and UEB was the biggest obstacle to a smooth transition. Amy said transcribers and money were needed to change materials to the new code, and she thought some materials would not be produced in UEB, saying “we pretty much know they’re probably not going to transfer over old copyrights and that kind of thing” (LoU, 11/30/15). Lola and Natasha were frustrated that they were unable to find materials and resources in UEB. Natasha wanted braille producers to be clearer about which materials were in UEB and which were not, so she did not unknowingly order the materials in the old code.

April and Sunny worried that seeing materials in both codes would confuse students. Sunny said:

> You know, they’re going to see all these different signs, and they’re not going to know what the heck it is or what it stands for or anything, and that’s going to confuse them. I think that they’ll be thinking they’re letters or some kind of a word or something, and they’re going to get it all mixed up. (LoU, 11/7/15)

April suggested training for teachers who know only UEB so they know what has changed from the old code and can in turn better inform their students of differences they may see between the old code and UEB.

**Attitudes.** Beth, Carol, Michelle, Stone, and Tracy all mentioned the emotional aspect of the change as an obstacle, using affective words such as anxious, scary, nervous, and fear in their descriptions of how many TVIs and braille readers were feeling about the transition to UEB. Beth said, “When I have been at conventions, adults who
had read braille for many years seemed to be a little anxious about the change, or didn’t necessarily have a positive … attitude about it” (LoU, 11/12/15). Michelle said:

Probably the biggest obstacle is just going to be out of fear. Because people don’t like change, … and people have been reading things one way for so long. That would be difficult, I think, if we had a change in print, and all of the sudden readers had to learn new phonetics stuff or something. (LoU, 11/15/15)

To overcome obstacles due to the emotional aspect of the change, Beth suggested informing people of the positive aspects of the change. Michelle thought it was important TVIs have a positive attitude about UEB, because they would be passing their attitude on to their students. Carol and Stone believed training and familiarity with UEB would ease TVIs’ fears.

Assessments. Amy, Natasha, Sunny, and Tracy referenced standardized testing when discussing obstacles to a smooth transition to UEB. They were unsure whether upcoming state assessments would be offered in UEB or the old code, but they saw problems with both approaches. Sunny felt the students would be confused if the test were in UEB before they had mastered the new code. She said:

They’re going see it in both codes, and really I just see them getting more and more confused. Especially those that are in school that are going to be taking standardized testing. If they haven’t mastered the UEB code, and that’s all they’re being presented with, you know, and maybe they haven’t even started really learning it well enough, then they’re going to see all of these signs, whether it’s italics or what it is. (LoU, 11/7/15)

Tracy felt standardized testing put enormous stress on teachers and students trying to transition to UEB. She said:

And when you put out guidelines and say you need to have this much under your belt by this date, we’re gonna start testing our kids in this, it just seems very overwhelming. It’s quite overwhelming to think the student’s gonna have to learn this and know it in order to take the standardized test. That’s a huge wall to me; it
is frustrating to me, and then I have to figure out how to make it un-frustrating for them. (LoU, 11/10/15)

The TVIs did not have suggestions to overcome this obstacle, but they did think it essential TVIs be informed which code(s) would be offered on upcoming assessments.

Status of UEB Implementation

The LoU Focused Interview Protocol questions are used to determine each participant’s level of use. A cross-case analysis of the participants’ answers to these questions along with their responses to the probing questions provided a general status of the implementation effort.

Teaching UEB. Ten of the TVIs interviewed began introducing the code changes to their students in the 2014-2015 school year; two began in the 2015-2016 school year. Three TVIs had only beginning braille students who were learning braille in UEB; no “transitioning” was required. Four TVIs considered implementation to be essentially complete; they were producing all materials in UEB and pointed out to students changes to the code as they came up in the reading. Five TVIs were introducing code changes sequentially to their students.

The TVIs reported using a combination of materials to teach UEB, including: teacher-created materials, classwork from the students’ general education classes embossed in UEB, materials from the Transitioning to Unified English Braille course from the Hadley Institute for the Blind and Visually Impaired, Ashcroft’s Programmed Instruction: Unified English Braille, Building on Patterns (adapted as needed by the TVI), The McDuffy Reader: A Braille Primer for Adults (UEB), and The ABCs of UEB. Several of the TVIs related that they required their students to read materials in both UEB
and the old code, because materials in the old code would be available for years to come, but they had their students write in UEB only. Four teachers noted that reading UEB came more quickly and easily to their students than writing UEB. Punctuation and typeform indicators (e.g., bold, italics, underline) appeared to be the hardest parts of UEB for students to learn. None of the TVIs were teaching their students UEB math, and only two TVIs said it was necessary to increase direct service time in their students’ Individualized Education Programs (IEPs) to teach UEB.

The TVIs were unsure when standardized assessments would be offered in UEB: three TVIs had dual braille/print readers who would be taking assessments in print; four TVIs believed the standardized assessments given in spring 2016 would be offered in UEB; three TVIs believed UEB would not be offered on standardized assessments until spring 2017; two said they did not know when standardized assessments would be offered in UEB.

**Attitudes and Opinions About UEB.** The TVIs were generally positive about UEB. They identified several strengths to the new code, including the elimination of braille signs that were ambiguous and confusing, greater consistency in the rules on when contractions can be used, improvement in computer translation and backtranslation capabilities, and that UEB better reflects print by providing multiple methods of adding emphasis. Three weaknesses in the code were mentioned: one TVI felt the letter sign was overused in UEB; one TVI missed some of the deleted contractions, which she said were space savers; and one TVI thought the new punctuation and typeform indicator signs were confusing. Difficulties identified by TVIs that were not specific to the code included: the mere fact that UEB is a change, change is hard, and old habits are hard to
break; the issue of materials existing in both the old code and UEB for years to come; and objections to UEB math (if the state decides to use UEB math).

When asked what they told others about UEB, the TVIs were generally positive. They primarily sought to reassure students, parents, and colleagues that the changes to the code were a good thing and that UEB was not difficult to learn. Responses included:

“It’s not something to be scared of, but you definitely need to learn it.”

“It’s not a huge difference and not something that people need to be alarmed about.”

“My personal experience with this has been so positive. Usually when I’m talking about it, I’m the positive voice.”

“For the kids it’s not a big deal.”

“The biggest thing that I want to convey ... is that it is not a scary thing.”

“I have to reassure [the student] that she’s got the basic braille down, and these few changes are not going to hurt her, and they’re not going to be hard.”

“We want them to see this as a positive thing for students who are now in school. I think they’re the ones who are going to get the greatest positive results from this thing.”

Two TVIs were more negative about UEB. One TVI who lost her own vision as an adult and who was a new TVI found the changes to be overwhelming, and one TVI was completely opposed to UEB and felt it should not have been adopted. When asked what they told others about UEB, the TVIs’ negative responses included:

“I wasn’t prepared to study something like this [UEB], and well, I had just learned this [braille]. I’m a little too blind—I’m blind period—and I’m a new braille teacher.”

“I don’t really see how it’s going to benefit the American people. I don’t. And I really think it’s a big mistake in doing this, because how many people out there will never learn the UEB code for whatever reasons, and they’re going to become more and more illiterate if they can’t read it in braille, and what, are they going to become audio listeners or what? They’re going to eventually lose their skills.”
Three teachers said they found learning UEB to be difficult, but two of those were new TVIs who had only recently learned braille, and they both said the difficulty was learning braille in general, not learning UEB in particular, since it was all they knew.

The TVI Profession. Five of the 12 TVIs interviewed were not certified by the state department of education in Visual Impairments. Their time teaching students with visual impairments varied between two and 23 years. Each of the seven TVIs who were certified reported having taught students with visual impairments before receiving their certification. Their time teaching before certification varied between one and four years.

Several TVIs specifically mentioned they were the only TVI in their school districts, and others reported being essentially “on their own,” having no other TVIs locally with whom to collaborate. When asked how they learned the United States had adopted UEB and how they typically learned about issues and trends in the field (e.g., new technology or curriculum, new legislation, updates to the code), TVIs listed many sources of information, including: colleagues, professional organizations (Association for Education and Rehabilitation of the Blind and Visually Impaired, Professionals in Blindness Education), consumer organizations (National Federation of the Blind), publications (Braille Monitor, Future Reflections), press releases (BANA), websites (Hadley Institute for the Blind and Visually Impaired, Perkins School for the Blind/Paths to Literacy, BANA, American Printing House for the Blind), social media, email and electronic mailing lists, and connections from their university coursework.

Summary

In this chapter, the researcher presented the results of the study, including demographic data on the participants and the results of the SoCQ survey, the participants'
written Open-Ended Concerns Statements, and the LoU focused interviews. Key themes were identified regarding: (1) TVIs’ concerns about UEB and the transition, (2) their perceived obstacles to the transition, and (3) the status of the implementation effort based on their current usage of UEB. The next chapter contains a summary of the study, conclusions drawn from the findings, a discussion, and recommendations.
A gap in the literature exists regarding the current status of Unified English Braille (UEB) implementation in the United States—the extent to which teachers of students with visual impairments (TVIs) have introduced UEB to their students and TVIs' concerns at this point in the transition—though the need for such information has been recognized in the field. Under the framework of change process theory, the researcher used the diagnostic tools of the Concerns-Based Adoption Model (CBAM) to provide a comprehensive description of TVIs' concerns about implementing UEB (Stages of Concern) and the levels at which they are currently using UEB (Levels of Use). Rather than studying this population solely in terms of how many TVIs are at each stage of concern or level of use, this study aimed to identify the breadth and nature of their concerns and the reasons why they are using or not using UEB; therefore, a case study methodology was used. The researcher consolidated quantitative data from the Stages of Concern Questionnaire (SoCQ) and qualitative data from written Open-Ended Concerns Statements and Levels of Use (LoU) Focused Interview transcripts to address the research questions:

1. What are TVIs' attitudes and beliefs toward the transition to UEB?
2. To what extent are TVIs currently using UEB?
Research Question 1: Stages of Concern

Of the 34 TVIs who responded to the survey, five TVIs (14.7%) designated themselves as non-users, 14 TVIs (41.2%) designated themselves as inexperienced (novice) users, and 15 TVIs (44.1%) designated themselves as experienced users (12 intermediate; three “old hand”). Ten of the respondents (29.4%) had received no formal training on UEB to date.

Stage 0 Unconcerned was the highest stage of concern for half of the TVIs who responded to the survey (50.0%). Stage 1 Informational was the next most frequent stage (23.5%), followed by Stage 5 Collaboration (17.6%), and Stage 2 Personal (8.8%). None of the TVIs who responded to the survey had peak scores at Stage 3 Management, Stage 4 Consequence, or Stage 6 Refocusing.

In their Open-Ended Concerns Statements, seven TVIs indicated they had no concerns regarding the transition to UEB. The key concerns expressed by the other TVIs included: the need for information on the changes to the code and instructional strategies for teaching UEB (training–self/teacher); which code(s) would be used for mathematical and science notation (math); their own abilities to learn and teach UEB (ability–self/teacher); the time required to learn and teach the new code, and how they would balance this with their other responsibilities (time); the availability of resources in UEB and the confusion of having materials in both the old code and UEB (materials); and how UEB may impact their students (ability–students).

Participants in the LoU interviews identified three significant obstacles to a smooth transition that matched the concerns listed above: the need for training including more information on the changes to the code and instructional strategies for teaching
UEB (training--self/teacher); the indecision by, and possible variation among, states regarding which code(s) will be used for mathematical and science notation (math); and the lack of resources in UEB along with the confusion of having materials in both the old code and UEB for years to come (materials). Two additional themes emerged as obstacles to a smooth transition: fear and anxiety over the change felt by some TVIs (attitudes), and confusion over which code(s) will be used for high-stakes assessments this year and in years to come (assessments).

Research Question 2: Levels of Use

Twelve of the 34 TVIs (35.3%) who completed the survey participated in an LoU interview. None of the LoU participants considered themselves to be non-users of UEB; four TVIs (33.3%) designated themselves as inexperienced users (novice), while eight TVIs (66.7%) designated themselves as experienced users (six intermediate; two “old hand”). All of the LoU participants had received some form of formal training on UEB. The researcher rated the participants’ levels of use based on their answers to the questions in the LoU Basic Interview Protocol. Six TVIs (50.0%) were at LoU III Mechanical Use, five TVIs (41.7%) were at LoU IVA Routine Use, and one TVI (8.3%) was at LoU IVB Refinement.

The interview participants’ peak concerns were evenly distributed between Stages 0, 1, and 5 (four TVIs each). The one TVI who had a “tie” for peak concern between Stage 1 and Stage 2 was tallied at Stage 1. The lower stage is used in a tie in order to be conservative in seeing development of SoC and making interventions (G. Hall, personal communication, March 13, 2016). All six TVIs at LoU III Mechanical Use had peak unrelated or self concerns. Two TVIs at LoU IVA Routine Use had peak unrelated
concerns, and three TVIs at LoU IVA Routine Use had peak impact concerns. The one TVI at LoU IVB Refinement had peak impact concerns.

A cross-case analysis of the participants’ answers to the LoU interview questions provided a general status of the implementation effort. The TVIs’ answers were compiled in three topic areas: teaching UEB, attitudes and opinions about UEB, and the TVI profession.

Conclusions

Analyzing the findings under CBAM theory regarding the predicted stages of concern and levels of use of individuals in certain stages of an implementation process leads to the following conclusions:

1. At this point in the implementation process, many TVIs, even those with experience using UEB, have unresolved self concerns about the transition. This may indicate inadequate or ineffective training and support.

2. TVIs have unusually high Collaboration concerns in relation to their other concerns, and there is a progression to more intense Collaboration concerns with increasing experience with UEB.

3. TVIs who designated themselves as non-users of UEB appear to be negative about the transition. The subgroup profile has strong indicators of possible resistance.

4. The TVIs who participated in interviews had slightly higher Levels of Use of UEB than predicted for first-year users of an innovation; however, there is some indication that use is “running ahead” of concerns (i.e., TVIs still have intense self concerns that have not been resolved).

Discussion

In analytic generalization, the theoretical framework may be used as “a template with which to compare the empirical results of the case study” (Yin, 1994, p. 31). In this study, the researcher used triangulation of data—between instruments and between participants—to provide a comprehensive description of TVIs’ concerns about
implementing UEB and the levels at which they are currently using UEB. In Chapter 4, data from each instrument and each participant were analyzed separately; the researcher performed a thematic analysis to identify common areas of concern among TVIs implementing UEB. Now all data will be considered as a whole and compared to CBAM theory regarding the predicted stages of concern and levels of use for individuals in certain stages of an implementation process. In other words, how well do the results of this study align with CBAM, and can unexpected results be explained?

**Participants**

To interpret the results of the study, it is important to understand the unique characteristics of the intended adopters: TVIs. TVIs are special educators who provide access to the general curriculum for students with visual impairments, through direct service and accommodations and modifications. They must possess specialized knowledge and skills in addition to those required by regular classroom teachers. TVIs are called upon to assess functional vision, interpret eye reports, determine appropriate learning media, use and teach adaptive technology, adapt classroom materials, teach braille, work effectively with related service special education teams and administrators, teach students a wide variety of daily living skills, and refer and transition students to appropriate adult rehabilitation and low vision services (Spungin & Ferrell, 2007). TVIs often have very large caseloads, which may include a diverse population of students who range in age, visual functioning, and additional disabilities. TVIs typically do not provide services at only one school. Nationwide, approximately 90% of the population of students with visual impairments receive services from an itinerant TVI (Corn & Spungin, 2003). In the itinerant model, the teacher is not housed in the student’s school,
but travels from school-to-school and/or town-to-town, often covering wide territories, especially in rural areas. In this study, 70.6% of the survey respondents were itinerant TVIs. In addition to the logistical challenges of the itinerant model, there are also personal challenges. Many school districts have only one TVI, so he or she does not have colleagues with whom to collaborate and share resources, instructional strategies, and ideas.

Due to a shortage of qualified teachers, many districts are forced to hire as TVIs either individuals who are temporarily licensed because, while they lack certification, they are enrolled in alternative certification programs, or teachers with out-of-area certifications (individuals who are not certified to teach students with visual impairments). This situation was reflected in this study; five of the 12 TVIs interviewed were not certified by the state department of education in Visual Impairments.

Attrition of current teachers is also a concern. Dignan (2012) reports, "VI professionals have an average of 7 years of experience prior to becoming certified. As a result, they are mid-career professionals on their first day. Therefore, they are closer to retirement when they start as VI professionals" (p. 23). In this study, none of the TVIs who responded to the survey were under 30: 30-39 years (8), 40-49 years (7), 50-59 years (8), 60-69 years (10), 70-79 years (1).

Innovation

In interpreting the results of the study, it is also important to understand the unique characteristics of the innovation: UEB. UEB is unique in that, although it was nationally-mandated, the implementation plans and timelines have been left up to each state. BANA adopted UEB in 2012, and as of January 2016, UEB officially replaced
Regardless of whether TVIs were in favor of adopting UEB, they have no choice but to transition their braille-reading students to UEB at this time; materials, including textbooks and other school materials, will no longer be produced in *English Braille American Edition*. States are at various stages of readiness to implement the new code, as are the TVIs in each state.

Hall and Hord (2015) note that, although mandates are often criticized due to their top-down approach, they can work, so long as sufficient support is provided. They explain:

> With a mandate, the priority is clear and there is an expectation that the innovation will be implemented. The mandate strategy fails when the only time the change process is supported is at the initial announcement of the mandate. When a mandate is accompanied by continuing communication, ongoing learning, on-site coaching, and time for implementation, it can work. (pp. 17–18)

When analyzing the results of the study, one must consider whether TVIs have been supported throughout the change process or were simply told the change was occurring and left to figure out on their own how to implement UEB. In this study, some TVIs designated themselves as non-users of UEB, while others designated themselves as novice, intermediate, or "old hand" users. Some considered transition already complete with their students, and others had just begun introducing the new code. There does not appear to be a concerted effort to support TVIs through the transition; three years after the United States adopted UEB, and less than three months from the official implementation date 29.4% of the TVIs who responded to the survey had received no formal training at all on UEB.
Stages of Concern

Hord et al. (2006) note that at any given time, individuals will have concerns at multiple stages; however, the stage or stages with the most intense concerns will evolve as implementation progresses. The emergence and resolution of concerns appear to be developmental—early concerns must be resolved before later concerns emerge. The hypothesized change of concerns over time is a wave pattern in which the most intense concerns of non-users are in Stages 0, 1, and 2; the most intense concerns of inexperienced users are in Stages 2, 3, and 4; and the most intense concerns of experienced users are in Stages 4, 5, and 6.

Of the 34 TVIs who responded to the survey in this study, five TVIs (14.7%) designated themselves as non-users, 14 TVIs (41.2%) designated themselves as inexperienced (novice) users, and 15 TVIs (44.1%) designated themselves as experienced users (12 intermediate; three "old hand"). Though 85.3% of respondent designated themselves as users of the innovation, the group profile resembled that of a typical non-user as described by George et al. (2006). They explain that the percentages at each stage of a typical non-user profile may vary, but the shape is identifiable by highest Stages 0, 1, and 2, and lowest Stages 4, 5, and 6, as shown in Figure 17.
Figure 17. Concerns Comparison: Typical Non-User vs. TVIs

TVIs with a peak Stage 0 may be unaware of UEB or the requirements for transitioning to UEB (non-users and inexperienced users) or they may be comfortable with the transition to UEB or have other priorities at this time (experienced users). TVIs with a peak Stage 1 have intense concerns regarding learning more substantive information about UEB. TVIs with a peak Stage 2 are focused on how transitioning to UEB will affect them personally. TVIs with a peak Stage 5 desire collaboration with other TVIs regarding the transition to UEB.

Although the TVIs’ group profile resembled that of a typical non-user, the pronounced spike at Stage 5 is atypical for non-users. In order to determine whether the spike was due to the concerns of a particular user category, the researcher broke the
group into subgroups based on self-designated user status (non-user, inexperienced user, and experienced user), as seen in Figure 18. CBAM's hypothesized development of concerns is shown in Figure 19 as a comparison.
Even when broken into subgroups by self-designated user status, the three TVI profiles (non-user, inexperienced user, and experienced user) all resemble the general shape of the typical non-user profile; however, some important distinctions are revealed. The non-user profile is notable, because it indicates negativity and possible resistance to the transition to UEB. The negative one-two split (Stage 2 higher than Stage 1) together with the tailing up at Stage 6 indicates “various degrees of doubt and potential resistance to an innovation” (George et al., 2006, p. 40). The higher Stage 2 indicates these TVIs’ concerns about how UEB will affect them personally may outweigh their desire to learn more about UEB. The tailing up of Stage 6 is a warning these TVIs may be resistant to transitioning to UEB, thinking UEB lacks merit or that something else (likely the status quo) is better.

Figure 18 shows the spike at Stage 5 is more pronounced in experienced users, followed by inexperienced users, and then non-users. Thus, the TVI profiles illustrate a progression to more intense Collaboration concerns with increasing experience. On the other hand, self and task concerns are significantly lower for the experienced users. They have less-intense Stage 1 Informational and Stage 2 Personal concerns than the other user categories. The TVI profiles show a progression to less intense Informational and Personal concerns with increasing experience, as would be expected, although these stages are still relatively higher than hypothesized for inexperienced users (Stages 2, 3, and 4 should be highest) and experienced users (Stages 4, 5, and 6 should be highest), as shown in Figure 19.
These profiles, which do not resemble hypothesized inexperienced and experienced user profiles, raise the questions:

- Why are TVIs' Stage 1 and Stage 2 concerns higher than expected in users?
- Why is there a distinct spike in TVIs' Stage 5 concerns?

When adopters with some experience using an innovation have unresolved self concerns, it is usually due to inadequate professional development or technical support on the innovation (G. Hall, personal communication, March 1, 2016). In this case, even after using UEB, many TVIs express the need for more substantive information, and they continue to have concerns regarding how UEB will affect them personally. This is valuable diagnostic information that can be used prescriptively to design appropriate interventions.

The spike at Stage 5 may be due to the nature of the job of TVIs. As mentioned previously, these TVIs are primarily itinerant. They cover multiple schools and there is usually only one TVI in a school district. TVIs are isolated and do not have colleagues with whom to collaborate and share resources. Implementing UEB may have fueled a desire to collaborate with peers in the field. Their experiences with the transition to UEB may have given TVIs a reason to want increased collaboration with colleagues to share resources and instructional strategies.

Levels of Use

According to Hord et al. (2006), adopters tend to move sequentially from LoU 0 Nonuse to LoU IVA Routine Use. At that point, some people move to a higher level of use, and some regress to a lower level, but the majority of people stay at Level IVA. The amount of time it takes to advance to Level IVA or beyond varies depending on many
factors, including the complexity of the innovation and the support given to adopters during implementation; however, as a general rule, 60-70% of first-year users of an innovation will be at Level III Mechanical Use. In this study, six of the 12 TVIs interviewed (50.0%) were at LoU III Mechanical Use, five TVIs (41.7%) were at LoU IVA Routine Use, and one TVI (8.3%) was at LoU IVB Refinement.

Comparing SoC to LoU data gives a more complete picture of the users. The expected relationship between use and concerns is a one-to-one correspondence. One might assume a user at LoU 0 would have peak concerns at Stage 0, a user at LoU 1 would have peak concerns at Stage 1, and so on; however, Hall and Hord (2015) have found that large data sets show a great deal of variation.

When LoU is higher than SoC, use is said to be “running ahead” of concerns; when SoC is higher than LoU, concerns are said to be “running ahead” of use (Hall, 1974, p. 9). Hall believed that there is a “middle range of relationships” between concerns and use where successful growth is possible, but that when concerns and use move too far out of correspondence, the adoption of the innovation may be in jeopardy (p. 7).

In this case, the interview participants’ peak concerns were evenly distributed between Stages 0, 1, and 5 (4 TVIs each). All six TVIs at LoU III Mechanical Use had peak unrelated or self concerns. Two TVIs at LoU IVA Routine Use had peak unrelated concerns, and three TVIs at LoU IVA Routine Use had peak impact concerns. The one TVI at LoU IVB Refinement had peak impact concerns. Though these levels of use of UEB are slightly higher than predicted for first-year users of an innovation, there is some indication that use is “running ahead” of concerns. The TVIs at LoU III Mechanical Use
with peak Stage 1 concerns still have intense, unresolved concerns regarding learning more substantive information about UEB. This situation may indicate they have received inadequate training and support. Until their self-concerns are resolved, they may not move to Level IVA Routine Use of UEB.

**Thematic Analysis**

A manual content analysis of the written Open-Ended Concerns Statements and the LoU interview transcripts revealed themes in the following areas: TVIs' concerns about UEB and the transition, the obstacles they perceived to the transition, and the status of the implementation effort.

The TVIs' key concerns about and perceived obstacles to the transition included: the need for training on code changes and instructional strategies (training); concerns about their own and students' abilities to transition to UEB (ability); the indecision by, and possible variation among, states regarding which code(s) will be used for mathematical and science notation (math); the time required to learn and teach UEB (time); the lack of resources in UEB and the confusion of having materials in both codes (materials); TVIs' attitudes about the transition to UEB (attitudes); and the lack of direction regarding which code(s) will be used for high-stakes assessments (assessments).

These concerns are not unexpected. Four of the areas of concern expressed by TVIs were the same as those identified by state assessment directors in BANA's 2014 survey to determine each state's readiness to transition to UEB: training, math, materials, and assessments (D'Andrea, 2015b). But TVIs expressed additional concerns about time, ability, and attitudes, whereas state assessment directors were more concerned about financial considerations of the transition.
A cross-case analysis of the participants' answers to the LoU interview questions provided a general status of the implementation effort. The TVIs' answers were compiled in three topics areas: teaching UEB, attitudes and opinions about UEB, and the TVI profession. One notable finding was that five of the 12 TVIs interviewed in this study were not certified by the state department of education in Visual Impairments, this despite the fact that they had been teaching students with visual impairments between two and 23 years. In addition, each of the seven TVIs who were certified reported having taught students with visual impairments for some period of time before receiving their certification. This is alarming. Although there is a shortage of TVIs across the country, for students with visual impairments to reach their full potential, it is imperative they receive appropriate services from qualified professionals. Ambrose-Zaken and Bozeman (2010) report that instruction from university-prepared professionals has been shown to lessen the negative impact experienced by students with congenital and acquired visual impairments. They state:

Research has found improved skills and greater independence in persons with visual impairments who received services from university-prepared professionals compared to persons with visual impairments who did not receive services or received services only from paraeducators (Ambrose-Zaken, n.d.; Darling-Hammond & Youngs, 2002; Erin, Holbrook, Sanspre, & Swallow, 2006; Stephens, Kirchner, Orr, Savino, & Rogers, 2009). (p. 150)

Without intervention, visual impairment may lead to significantly delayed developmental milestones in children, a loss of independence in adolescence, and both higher unemployment rates and increased incidences of depression in adulthood (Ambrose-Zaken & Bozeman, 2010).
Recommendations

Recommendations for Practice

The tools of CBAM are used to identify concerns and analyze the current use of an innovation. Information gathered from the tools is then used to make a concerns-based diagnosis, so appropriate interventions can be designed to resolve concerns and facilitate and accelerate higher levels of use of the innovation (Hall et al., 1973; Hord et al., 2006). Although they acknowledge there is no “absolute set of universal prescriptions,” Hord et al. (2006) provide a list of examples of interventions that may be useful for individuals at each stage of concern (see Appendix M). The examples for adopters with high Stage 1, 2, and 5 concerns may be especially useful in this case, and were used to form the recommendations below.

The transition to UEB in the United States will require many changes for both personnel and infrastructure. TVIs who may have been teaching braille for years are now tasked with learning a new code, teaching it to students who may or may not already be proficient in the current braille codes, developing instructional strategies, and obtaining new materials. They will need support and resources to guide them through the process. The diagnostic data gathered in this study can be used in a prescriptive manner to design the types of supports necessary to support TVIs and ensure a successful implementation process.

Based on the findings of this study and recommendations of the TVIs interviewed, to resolve TVIs’ concerns about the transition to UEB and facilitate higher levels of use, state UEB Implementation Teams or other groups or individuals
responsible for facilitating the transition to UEB should consider the following interventions:

1. Conduct regional training workshops on UEB (changes to the code).
   *(Addresses: training, ability, materials, attitudes)*
   
   a. Provide lists of resources for learning UEB and “cheat sheets” showing the major changes.
   
   b. Provide lists of resources for obtaining materials in UEB.

2. Conduct regional training workshops on instructional strategies for transitioning students to UEB.
   *(Addresses: training, ability, materials, time, attitudes)*
   
   a. Provide sample IEP goals specific to teaching UEB.
   
   b. Provide sample lesson plans for transitioning students to UEB.
   
   c. Provide sample timelines for transitioning students to UEB.

3. Recruit “mentor TVIs” who have already transitioned their students and who are willing to share resources and answer questions via an electronic mailing list, web page, social media, and/or one-on-one consultations with TVIs in need of assistance.
   *(Addresses: training, ability, materials, time, attitudes, assessments, math)*

4. Solicit input from TVIs regarding which code(s) should be used for high-stakes assessments this year and in the future and which code(s) should be used for mathematical and science notation. Keep TVIs informed when decisions are made on issues such as these that will directly affect them and their students.
   *(Addresses: assessments, math)*

**Recommendations for Further Study**

In this study, the researcher examined the transition to UEB through the lens of change theory. The data from the diagnostic tools of CBAM were used to provide a comprehensive description of TVIs’ concerns about implementing UEB and the levels at which they are currently using UEB. Further studies are recommended to investigate: (1) the perceptions of other stakeholders affected by the transition to UEB, (2) longitudinal
aspects of the transition to UEB, (3) the effectiveness and feasibility of the math codes available for use at this time, and (4) the preparedness of those currently teaching students with visual impairments.

1. Investigate perceptions of other stakeholders affected by the transition to UEB.

The transition to Unified English Braille (UEB) will affect many stakeholders; however, in order to address the K-12 educational setting, this study focused exclusively on the perceptions and behaviors of TVIs. UEB training and implementation plans vary state-to-state; therefore, the participants in the study were limited to TVIs in one southern state who volunteered to participate in the study. Further studies could investigate the perceptions of TVIs in other states or the perceptions of other stakeholders, such as braille readers and braille transcribers, regarding the transition to UEB.

2. Investigate longitudinal aspects of the transition to UEB.

This study was a snapshot in time of an implementation process that will occur over several years or more. Longitudinal aspects were not studied; therefore, no conclusions could be drawn in regard to how the TVIs in the study might progress through the Stages of Concern and Levels of Use or the effectiveness of any interventions provided. A longitudinal study could track TVIs’ progress throughout the UEB implementation process and could evaluate the effectiveness of any interventions provided, such as those recommended above.

3. Investigate the effectiveness and feasibility of the math codes available for use in the United States at this time: UEB math and Nemeth code.

Although January 4, 2016 was the official implementation date for UEB in the United States, TVIs are still unclear which code(s) will be used for math and science
notation. Some state implementation plans specify either UEB or Nemeth as the code that will be used in that state. Others follow the guidance given by BANA (2015) indicating the decision to use UEB or the Nemeth Code should be made based on braille readers' individual needs. Research is needed so decisions can be made based on empirical data and not personal preferences. Some possible research questions posed by D'Andrea et al. (2014) include:

- Is the use of a single-number system beneficial to young children rather than learning two different sets of numbers and symbols? If so, when would students transition to Nemeth code and how could this transition be done?

- Do teachers find UEB easier to learn and therefore begin mathematics instruction earlier?

- Do the length and number of symbols have an impact on reading and understanding mathematical expressions? (pp. 169–170)

TVIs need to know which code(s) to teach, and if the decision is to be based on braille readers' individual needs, they need to know the criteria by which to make that determination.

4. Investigate the preparedness of those currently teaching students with visual impairments.

Studies to investigate the preparedness of those teaching students with visual impairments could determine whether it is a widespread practice for districts to employ uncertified personnel to serve students with visual impairments or whether it is a state-specific issue. These studies could also explore what requirements for certification these teachers are missing and what options are available for completing those requirements. Finally, studies could explore differences in outcomes between students receiving instruction from certified teachers versus those receiving services from uncertified teachers.
Overview of Braille

Reading Braille

Braille is a system of touch reading and writing for the blind developed by Louis Braille in 1821. Braille users read by moving fingers on one or both hands from left to right along each line. The braille cell, an arrangement of six raised dots in two columns of three dots each, is the basic unit for reading and writing braille. Sixty-three different patterns are possible from the six dots in a braille cell:

The Braille Cell

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>●</td>
<td>4</td>
</tr>
<tr>
<td>●</td>
<td>●</td>
<td>5</td>
</tr>
<tr>
<td>●</td>
<td>●</td>
<td>6</td>
</tr>
</tbody>
</table>

Cells may represent a letter, a word, a combination of letters, a numeral, a punctuation mark, or an indicator (a sign that has no counterpoint in print, but is necessary to correctly interpret certain braille symbols, such as a capital indicator, indicating that the following letter is capitalized).

Braille can be written in uncontracted or contracted form. In uncontracted braille, there is a one-to-one correspondence between print letters/punctuation and braille cells. Each braille cell represents a letter, a punctuation symbol, or an indicator. Uncontracted braille is typically used only for beginning readers. Contracted braille adds contractions, cells or combinations of cells that represent words and parts of words. There are 180 contractions in the Unified English Braille (UEB) code. Almost all braille books are written in contracted braille to permit faster braille reading and help reduce the size of braille books. The following is an example of uncontracted braille:
I like you.

In this example, the first cell is a capital letter indicator, indicating that the following letter, "i," is capitalized, and the last cell is a period. The other braille cells correspond to the print letters in the words "like" and "you." The following is an example of contracted braille:

I like you.

As in the previous example, the first cell is a capital letter indicator, indicating that the following letter, "i," is capitalized, and the last cell is a period. The other cells are alphabet whole word signs that correspond to the print words in the sentence—a braille "l" for "like" and a braille "y" for "you."

Prior to the adoption of UEB, the United States used specialized codes for some subjects in addition to the English Braille American Edition literary code. The Nemeth Code of Braille Mathematics and Science Notation, developed by Dr. Abraham Nemeth, contains characters that represent the symbols used in complex mathematics, such as those used in algebra, geometry, and calculus. It is not clear to what extent Nemeth will still be used in the United States (see Chapter 1). As of January 4, 2016, the official braille codes for the United States are Unified English Braille, Nemeth Code for
The Importance of Braille

In the first half of the nineteenth century, most blind/visually impaired students in the United States received instruction at state residential schools for the blind. Almost all of these students were taught braille regardless of whether they had residual vision. When Public Law 94-142, the Education for All Handicapped Children Act (currently enacted as the Individuals with Disabilities Education Act), was passed in 1975 allowing children with disabilities to be educated in their neighborhood schools, fewer students were taught braille.

The trend away from braille as a primary reading medium is significant in size and effect. In their 2013 Annual Report, the American Printing House for the Blind (APH) described the primary reading medium of students in the United States receiving adapted educational materials from APH through the Act to Promote the Education of the Blind. According to their data, of the 59,621 children who were classified as legally blind, only approximately 9% (5,117) used braille, while 29% (17,205) were visual readers, 8% (4,890) were auditory readers, 19% (11,309) were pre-readers, and 35% (21,100) were non-readers (AFB, 2015). This data becomes truly alarming when one considers what braille literacy means to students with visual impairments and the effect it can have on their futures. Research suggests that people with visual impairments who read braille demonstrate superior literacy skills to those who read large print (Ryles, 1997), and that they have higher employment rates, higher educational levels, and greater
financial self-sufficiency than those who read large print (Ryles, 1996). Braille may also contribute to adults’ feelings of self-esteem and self-identity (Schroeder, 1996).

Fewer students who are classified as blind/visually impaired are being taught braille as a primary reading medium, in part, because more teachers are choosing to use large print, audible materials, and other technology in place of braille for students with some residual vision (Amato, 2002; Friedman, 2004; Ryles, 1996; Spungin, 1996). In the first half of the nineteenth century, most BVI students in the United States received instruction at state residential schools for the blind. Spungin (1996) identified eight possible reasons for the increasing illiteracy of people who are blind or visually impaired:

1) the lack of accurate demographic statistics on individuals in the United States who are blind;

2) the emphasis, during the past 25 years, on teaching children with residual vision to read print;

3) negative attitudes toward blind people and the communication skills they need;

4) lack of standardized braille teaching methods and of quality control to ensure high standards of teaching;

5) the complexity of the braille code;

6) technological advances, especially speech output, as a viable substitute for braille;

7) the practice of placing visually impaired children in regular classrooms, with support from an itinerant teacher who visits only once a week; and

8) limitations of the Individualized Education Program (IEP) process, such that the IEP often is based on the school’s budget and availability of staff. (Concerns in 1989, para. 1)

The National Federation of the Blind (2009) identified four factors contributing to the low literacy among BVI people: the shortage of teachers, misconceptions about the
difficulty of braille, the practice of not teaching braille to children with low vision, and the mistaken belief that technology obviates the need for braille. They summarized what they call The Braille Literacy Crisis in America as follows:

There can be no doubt that the ability to read and write Braille competently and efficiently is the key to education, employment, and success for the blind. Despite the undisputed value of Braille, however, only about 10 percent of blind children in the United States are currently learning it. Society would never accept a 10 percent literacy rate among sighted children; it should not accept such an outrageously low literacy rate among the blind. (NFB, 2009, The Future Is in Our Hands, para. 1)

The importance of braille is further highlighted in the *Individuals with Disabilities Education Act* (IDEA), which requires that every child with visual impairment be provided with braille, unless the IEP team determines, after an evaluation of current and future needs, that the use of braille is not appropriate for the child [Section 614 (d)(3)(B)(iii)]. Not all students with visual impairments will be braille readers; however, IDEA requires that braille be considered.
Unified English Braille (UEB) Timeline


1991: Cranmer and Nemeth proposed one code that would encompass all literary and technical symbols (Bogart, 2009).

1991: The Braille Authority of North America (BANA) initiated the Unified Braille Code (UBC) research project (Bogart et al., 2000).

1991: International Council on English Braille (ICEB) formed with the purpose of standardizing the English braille codes (Bogart, 2009).

1993: ICEB took over the UEB research project (Bogart et al., 2000).

1995: Draft code (UBC) ready (Bogart & Koenig, 2005).

1997: International evaluation of UBC conducted in seven English speaking countries and Japan (Bogart & Koenig, 2005).

2004: ICEB declared that UEB was sufficiently complete to be regarded as an international standard for English braille and suggested that braille authorities of the member nations consider adopting it for their countries (April) (ICEB, 2012).

2004: South Africa adopted UEB (May) (BSA, n.d.).

2005: Nigeria adopted UEB (February) (NABRACON, n.d.).


2011: United Kingdom adopted UEB (October) (UKAAF, n.d.).


APPENDIX C

UEB RESEARCH STUDIES
## UEB Research Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Participants/ Respondents</th>
<th>Design/ Methodology</th>
<th>Peer-reviewed</th>
<th>Category*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bogart &amp; Koenig (2005)</td>
<td>Australia, Canada, Japan, New Zealand, Nigeria, South Africa, the United Kingdom, the United States</td>
<td>446</td>
<td>Quantitative: questionnaire</td>
<td>Yes</td>
<td>P</td>
</tr>
<tr>
<td>ICEB (1998a)</td>
<td>Australia</td>
<td>68</td>
<td>Quantitative: questionnaire</td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>ICEB (1999a)</td>
<td>Canada</td>
<td>40</td>
<td>Quantitative: questionnaire</td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>ICEB (1998b)</td>
<td>Consolidated: Canada and the United States</td>
<td>212</td>
<td>Quantitative: questionnaire</td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>ICEB (1998c)</td>
<td>Japan</td>
<td>28</td>
<td>Quantitative: questionnaire</td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>ICEB (1998d)</td>
<td>Nigeria</td>
<td>14</td>
<td>Quantitative: questionnaire</td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>ICEB (1998e)</td>
<td>South Africa</td>
<td>49</td>
<td>Quantitative: questionnaire</td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>ICEB (1999c)</td>
<td>New Zealand</td>
<td>56</td>
<td>Quantitative: questionnaire</td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>ICEB (1999d)</td>
<td>The United States</td>
<td>172</td>
<td>Quantitative: questionnaire</td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Participants/Respondents</td>
<td>Design/Methodology</td>
<td>Peer-reviewed</td>
<td>Category</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------</td>
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<td>-----------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td><em>ICEB</em> (2000)</td>
<td><em>The United Kingdom</em></td>
<td>19</td>
<td><em>Quantitative: questionnaire</em></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Gerber &amp; Smith (2006)</td>
<td>Canada</td>
<td>85</td>
<td><em>Qualitative: focus groups</em></td>
<td>Yes</td>
<td>P</td>
</tr>
<tr>
<td>Wetzel &amp; Knowlton (2006a)</td>
<td>The United States</td>
<td>79</td>
<td><em>Qualitative: questionnaire, focus groups</em></td>
<td>Yes</td>
<td>P</td>
</tr>
<tr>
<td>BAUK (2008)</td>
<td>The United Kingdom</td>
<td>470</td>
<td><em>Quantitative: questionnaire</em></td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>White (2011b)</td>
<td>The United Kingdom</td>
<td>107</td>
<td>Mixed methods: <em>questionnaire, interviews</em></td>
<td>No</td>
<td>P</td>
</tr>
<tr>
<td>Cryer, Home, &amp; Morley-Wilkins (2013b)</td>
<td>The United Kingdom</td>
<td>27</td>
<td><em>Qualitative: focus groups</em></td>
<td>Yes</td>
<td>P</td>
</tr>
<tr>
<td>Bogart, D’Andrea &amp; Koenig (2004)</td>
<td>Canada</td>
<td>N/A</td>
<td><em>Quantitative: descriptive</em></td>
<td>No</td>
<td>PA</td>
</tr>
<tr>
<td>Knowlton &amp; Wetzel (2006)</td>
<td>The United States</td>
<td>N/A</td>
<td><em>Quantitative: descriptive</em></td>
<td>Yes</td>
<td>PA</td>
</tr>
<tr>
<td>Cryer &amp; Home (2008)</td>
<td>The United Kingdom</td>
<td>N/A</td>
<td><em>Quantitative: descriptive</em></td>
<td>No</td>
<td>PA</td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Participants/Respondents</td>
<td>Design/Methodology</td>
<td>Peer-reviewed</td>
<td>Category</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------</td>
<td>--------------------------</td>
<td>---------------------------------------------------------</td>
<td>---------------</td>
<td>----------</td>
</tr>
<tr>
<td>Wetzel &amp; Knowlton (2006b)</td>
<td>The United States</td>
<td>L = 52 T = 40</td>
<td>Quantitative: L: 3 x 2 x 4 T: 2 x 2 x 8 mixed factorial</td>
<td>Yes</td>
<td>R</td>
</tr>
<tr>
<td>Holbrook &amp; MacCuspie (2010)</td>
<td>Canada and the United States</td>
<td>5</td>
<td>Qualitative: observations, focus groups</td>
<td>Yes</td>
<td>R</td>
</tr>
<tr>
<td>Cryer, Home, &amp; Morley-Wilkins (2013a)</td>
<td>The United Kingdom</td>
<td>6</td>
<td>Qualitative: observations, interviews</td>
<td>Yes</td>
<td>R</td>
</tr>
<tr>
<td>White (2011a)</td>
<td>Australia and New Zealand</td>
<td>10</td>
<td>Qualitative: interviews</td>
<td>No</td>
<td>I</td>
</tr>
</tbody>
</table>

Source: Adapted from D'Andrea et al. (2014)

*Category:
P = Perceptions
PA = Physical Attributes
R = Readability
I = Implementation
Stages of Concern Questionnaire

A Message from Your Survey Coordinator

Informed Consent

Please read the following information, check the box below to signify your consent, and proceed to the questionnaire.

Who is conducting the study?
Laura Boeck, M.A.Ed.
Doctoral Candidate
Louisiana Tech University
318-257-4554
lboeck@latech.edu

Faculty Adviser:
Dr. Dawn Basinger
318-257-2382

What is the purpose of this study?
The purpose of this study is to evaluate the concerns of teachers of students with visual impairments (TVIs) regarding the transition to Unified English Braille (UEB).

How is the study done?
If you agree to take part in this study, you will be asked to respond to a short online questionnaire regarding your background and your feelings about the transition to UEB.

You will also be given the opportunity to participate in a short interview at a later date; however, it is not required, and your questionnaire is valuable whether or not you participate in an interview.

Study results
The results of this study may be reported in public presentations and may also be published in a peer-reviewed research report. No identifying information about study participants will be reported at any time.

Are there any risks to taking part in this study?
I do not anticipate any risks to you participating in this study. Louisiana Tech is not able to offer financial compensation nor to absorb the costs of medical treatment should you be injured as a result of participating in this research.

Are there any benefits to taking part in this study?
Louisiana Tech is not able to offer financial compensation.

How will your privacy be protected?
All collected information will be held confidential and viewed only by the researchers. Information on teachers' participation or nonparticipation in the study will be held confidential and not shared with school administrators.

Contact for more information
If you have any questions or concerns about what is being asked of you, please contact the principal investigator whose name and contact information are listed at the top of this form.

If you have any concerns about your rights as a research subject and/or your experiences while participating in this study, you may contact members of the Human Use Committee of Louisiana Tech University:

Dr. Stan Napper (318-257-3055)
Dr. Mary M. Livingston (318-257-2292 or 318-257-5066)

Consent
Taking part in this study is entirely up to you. You have the right to refuse to participate in this study. If you decide to take part, you may choose to pull out of the study at any time without giving a reason and with no penalty.

If you agree to participate, please check the box below.

Thank you for your interest in this study.
☐ I have read and understood the description of the study, "Implementing the Unified English Braille (UEB) Code: Perspectives of Teachers of Students with Visual Impairments (TVIs)," and its purposes and methods. I understand that my participation in this research is strictly voluntary and my participation or refusal to participate in this study will not affect my relationship with Louisiana Tech University or my grades in any way. Further, I understand that I may withdraw at any time or refuse to answer any questions without penalty. Upon completion of the study, I understand that the results will be freely available to me upon request. I understand that the results of my survey will be confidential, accessible only to the principal investigators, myself, or a legally appointed representative. I have not been requested to waive nor do I waive any of my rights related to participating in this study.

Please click the button below to start the questionnaire.

Continue to the questionnaire
Implementing the Unified English Braille Code: Perspectives of TVIs

Instructions and Sample

The purpose of this questionnaire is to determine what people are thinking about when using various programs or practices. It is intended to assess their levels of concerns at various times during the adoption process.

The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years' experience using them. Therefore, many of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please select “0” on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

The fictional survey items below demonstrate how responses might be filled in by a person who loves to eat pizza but does not like pepperoni. The person has never left the United States before, and the person does not enjoy eating the same meal two days in a row. In this case, the concern being asked about is “EATING PIZZA” and is highlighted in each question.

<table>
<thead>
<tr>
<th></th>
<th>Irrelevant</th>
<th>Not true of me now</th>
<th>Somewhat true of me now</th>
<th>Very true of me now</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy Eating Pizza.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I enjoy Eating Pizza four or five days per week.</td>
<td></td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I enjoy Eating Pizza with pepperoni.</td>
<td></td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>I have enjoyed Eating Pizza when traveling to foreign countries.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Stages of Concern Questionnaire

Select one response for each question below.

Please respond to the items in terms of your present concerns, or how you feel about your involvement with Unified English Braille (UEB). We do not hold to any one definition of the innovation so please think of it in terms of your own perception of what it involves. Phrases such as "this approach" and "the new system" all refer to the same innovation. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with the innovation.
<table>
<thead>
<tr>
<th>#</th>
<th>Irrelevant</th>
<th>Not true of me now</th>
<th>Somewhat true of me now</th>
<th>Very true of me now</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I am concerned about students' attitudes toward Unified English Braille (UEB).</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>I now know of some other approaches that might work better than Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>I am more concerned about another innovation.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>I am concerned about not having enough time to organize myself each day (in relation to Unified English Braille (UEB)).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5.</td>
<td>I would like to help other faculty in their use of Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6.</td>
<td>I have a very limited knowledge about Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.</td>
<td>I would like to know the effect of reorganization on my professional status.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8.</td>
<td>I am concerned about conflict between my interests and my responsibilities.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9.</td>
<td>I am concerned about revising my use of Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10.</td>
<td>I would like to develop working relationships with both our faculty and outside faculty using Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11.</td>
<td>I am concerned about how Unified English Braille (UEB) affects students.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12.</td>
<td>I am not concerned about Unified English Braille (UEB) at this time.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13.</td>
<td>I would like to know who will make the decisions in the new system.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14.</td>
<td>I would like to discuss the possibility of using Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15.</td>
<td>I would like to know what resources are available if we decide to adopt Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>16.</td>
<td>I am concerned about my inability to manage all that Unified English Braille (UEB) requires.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Irrelevant</td>
<td>Not true of me now</td>
<td>Somewhat true of me now</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>--------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>17.</td>
<td>I would like to know how my teaching or administration is supposed to change.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>18.</td>
<td>I would like to familiarize other departments or persons with the progress of this new approach.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>19.</td>
<td>I am concerned about evaluating my impact on students (in relation to Unified English Braille (UEB)).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20.</td>
<td>I would like to revise the Unified English Braille (UEB) approach.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21.</td>
<td>I am completely occupied with things other than Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>22.</td>
<td>I would like to modify our use of Unified English Braille (UEB) based on the experiences of our students.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>23.</td>
<td>I spend little time thinking about Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>24.</td>
<td>I would like to excite my students about their part in this approach.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25.</td>
<td>I am concerned about time spent working with nonacademic problems related to Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>26.</td>
<td>I would like to know what the use of Unified English Braille (UEB) will require in the immediate future.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>27.</td>
<td>I would like to coordinate my efforts with others to maximize the effects of Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>28.</td>
<td>I would like to have more information on time and energy commitments required by Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>29.</td>
<td>I would like to know what other faculty are doing in this area.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>30.</td>
<td>Currently, other priorities prevent me from focusing my time on Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>31.</td>
<td>I would like to determine how to supplement, enhance, or replace Unified English Braille (UEB).</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>32.</td>
<td>I would like to use feedback from students to change the program.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
33. I would like to know how my role will change when I am using Unified English Braille (UEB).

34. Coordination of tasks and people (in relation to Unified English Braille (UEB)) is taking too much of my time.

35. I would like to know how Unified English Braille (UEB) is better than what we have now.

Please answer the following 10 items:

Years of experience teaching blind/visually impaired students:
- 1-2
- 3-4
- 5-10
- 11-20
- 21-30
- over 30

Gender:
- female
- male

Age:
- 20-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70-79

Highest degree earned:
- Bachelor's
- Master's
- Doctorate

Race:
- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White
- Mixed Race

Service delivery model: Are you itinerant or based in one school/location?
- Itinerant
- Based in one school/location
School setting(s) in which you teach blind/visually impaired students: (select all that apply)
□ Public school
□ Private school
□ Residential school
□ Other

If you selected "other," please specify: _______________________

How many braille readers are currently on your caseload?

☐ None
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ More than 10

What formal training on UEB have you received to date? (select all that apply)
□ None
□ Live training session/workshop
□ Online training course
□ Correspondence course
□ College course
□ Other

If you selected "other," please specify: _______________________

In your current use of UEB, do you consider yourself to be:

☐ non-user
☐ novice
☐ intermediate
☐ old hand

Please answer the following 2 questions:

Please enter a unique id consisting of 4 numbers. You may use the last 4 digits of your Social Security Number or any other unique four-digit number that you can remember. This number will be used solely to link data.

__________________________
When you think about the transition to UEB, what are you concerned about? (Do not say what you think others are concerned about, but only what concerns you now.) Please write in complete sentences, and please be frank.

Thank you for your participation in this study! You will be redirected to another website when you submit this survey to answer one question regarding your willingness to participate in a short interview about UEB at a later date. The websites are not linked in any way, so your survey responses cannot be tied to your contact information, should you choose to leave it. Thanks so much! Laura Bostick.
APPENDIX E

FORMAT OF THE LOU BRANCHING INTERVIEW
Format of the LoU Branching Interview

Are you using the Innovation?

NO
LoU 0, I, II

YES
LoU III, IVA, IVB, V, VI

Have you decided to use it and set a date to begin use?

YES
LoU II

NO
LoU 0, I

What kinds of changes are you making in your use of the innovation?

User-Oriented LoU III

Nothing Unusual LoU IVA

Impact-Oriented LoU IVB, V, VI

Are you currently looking for information about the innovation?

YES
LoU I

NO
LoU 0

Are you coordinating your use of the innovation with other users, including another not in your original group of users?

NO
LoU IVB

YES
LoU V

Are you planning or exploring making major modifications or replacing the innovation?

NO
LoU IVB

YES
LoU VI

NO
LoU V

Source: Hord & Roussin, 2013, p. 122
The Basic Interview Protocol

<table>
<thead>
<tr>
<th>Question</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you using the innovation?</td>
<td>To distinguish between users and nonusers; to break LoU 0–II from LoU III–VI</td>
</tr>
</tbody>
</table>

**IF YES**

<table>
<thead>
<tr>
<th>Question</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you see as the strengths and weaknesses of the innovation in your situation? Have you made any attempt to do anything about the weaknesses?</td>
<td>To probe Assessing and Knowledge Categories.</td>
</tr>
<tr>
<td>Do you ever talk with others about the innovation? What do you tell them?</td>
<td>To probe Sharing Category and check Decision Point E.</td>
</tr>
<tr>
<td>What do you see as being the effects of the innovation? In what way have you determined this? Are you doing any evaluating, either formally or informally, of your use of the innovation? Have you received any feedback from students? What have you done with the information you get?</td>
<td>To probe Assessing Category.</td>
</tr>
<tr>
<td>Have you made any changes recently in how you use the innovation? What? Why? How recently? Are you considering making any changes?</td>
<td>To distinguish between LoU III (user-oriented changes), LoU IVB (impact-oriented changes), and LoU IVA (no or routine changes); to probe Status Reporting and Performing Categories.</td>
</tr>
<tr>
<td>As you look ahead to later this year, what plans do you have in relation to your use of the innovation?</td>
<td>To probe Planning and Status Reporting Categories.</td>
</tr>
<tr>
<td>Question</td>
<td>Purpose</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Are you working with others (outside of anyone you may have worked with from the beginning) in your use of the innovation? Have you made any changes in your use of the innovation based on this coordination?</td>
<td>To separate LoU V from III, IVA, and IVB. If a positive response is given, LoU V probes (below) are used.</td>
</tr>
<tr>
<td>Are you considering making or planning to make major modifications or to replace the innovation at this time?</td>
<td>To separate LoU VI from III, IVA, IVB, and V.</td>
</tr>
</tbody>
</table>

**LoU V Probes**

<table>
<thead>
<tr>
<th>Question</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do you work together? How frequently?</td>
<td>To verify Decision Point F; to probe Performing Category.</td>
</tr>
<tr>
<td>What are the strengths and the weaknesses of this collaboration for you?</td>
<td>To probe Knowledge Category.</td>
</tr>
<tr>
<td>Are you looking for any particular kind of information in relation to this collaboration?</td>
<td>To probe Acquiring Information Category.</td>
</tr>
<tr>
<td>When you talk to others about your collaboration, what do you share with them?</td>
<td>To probe Sharing Category.</td>
</tr>
<tr>
<td>Have you done any formal or informal evaluation of how your collaboration is working?</td>
<td>To probe Assessing Category.</td>
</tr>
<tr>
<td>What plans do you have for this collaborative effort in the future?</td>
<td>To probe Planning Category.</td>
</tr>
<tr>
<td>Can you summarize for me where you see yourself right now in relation to the use of the innovation? (Optional Question)</td>
<td>To get a concise picture of the user's perception of his/her use or nonuse.</td>
</tr>
<tr>
<td>Question</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Have you made a decision to use the innovation in the future? If so, when?</td>
<td>To separate LoU 0 from I; to probe Status Reporting, Planning, and Performing Categories; to separate LoU I from II.</td>
</tr>
<tr>
<td>Can you describe the innovation for me as you see it?</td>
<td>To probe Knowledge Category.</td>
</tr>
<tr>
<td>What are the strengths and weaknesses of the innovation for your situation?</td>
<td>To probe Assessing Category.</td>
</tr>
<tr>
<td>At this point in time, what kinds of questions are you asking about the innovation? Give examples if possible.</td>
<td>To probe Assessing, Sharing, and Status Reporting Categories.</td>
</tr>
<tr>
<td>Do you ever talk with others and share information about the innovation? What do you share?</td>
<td>To probe Sharing Category.</td>
</tr>
<tr>
<td>What are you planning with respect to the innovation? Can you tell me about any preparation or plans you have been making for the use of the innovation?</td>
<td>To probe Planning Category.</td>
</tr>
<tr>
<td>Can you summarize for me where you see yourself right now in relation to the use of the innovation? (Optional Question)</td>
<td>To get a concise picture of the user’s perception of his/her use or nonuse.</td>
</tr>
<tr>
<td>Question</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Why did you stop using the innovation?</td>
<td></td>
</tr>
<tr>
<td>Can you describe for me how you organized your use of the innovation, what problems you found, and what its effects appeared to be on students?</td>
<td></td>
</tr>
<tr>
<td>When you assess the innovation at this point in time, what are its strengths and weaknesses for you?</td>
<td></td>
</tr>
</tbody>
</table>

Source: Hall et al., 2006, pp. 53–56
APPENDIX G

HUMAN USE COMMITTEE APPROVAL
TO: Dr. Dawn Huang and Ms. Laura Bortles
FROM: Dr. Stan Napper, Vice President Research & Development
SUBJECT: HUMAN USE COMMITTEE REVIEW
DATE: July 14, 2015

In order to facilitate your project, an EXPEDITED REVIEW has been done for your proposed study entitled:

"Implementing the Unified English Braille Code in Louisiana: Perspectives of Teachers of Students with Visual Impairments"

HUC 1334

The proposed study's revised procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be sensitive in nature or implication. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Informed consent is a critical part of the research process. The subjects must be informed that their participation is voluntary. It is important that consent materials be presented in a language understandable to every participant. If you have participants in your study whose first language is not English, be sure that informed consent materials are adequately explained or translated. Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

Projects should be renewed annually. This approval was finalized on July 14, 2015 and this project will need to receive a continuation review by the IRB if the project, including data analysis, continues beyond July 14, 2016. Any discrepancies in procedures or changes that have been made including approved changes should be noted in the review application. Projects involving NIH funds require annual education to be documented. For more information regarding this, contact the Office of University Research.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researcher's responsibility to notify the Office of Research or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

If you have any questions, please contact Dr. Mary Livingston at 257-2392 or 257-5066.
MEMORANDUM

TO: Office of University Research, Human Use Committee, c/o Barbara Talbot

FROM: Laura Bostick

SUBJECT: Request to Use Transcription Service for Dissertation

DATE: October 29, 2015

My dissertation study, "Implementing the Unified English Braille Code in Louisiana: Perspectives of Teachers of Students with Visual Impairments" (HUC 1334) was approved by the Human Use Committee on July 14, 2015. The study utilizes two instruments: an online questionnaire (Stages of Concern Questionnaire) and a structured interview protocol (Levels of Use Interview Protocol). The interviews will be conducted over the phone, and they will be recorded and transcribed for analysis. No names will be used during the recorded calls.

I am requesting permission to use a transcription service called NoNotes (https://www.nomnotes.com/). NoNotes provides a phone application for recording calls. The audio file is sent to the subscriber immediately. If the subscriber has ordered transcription, the transcript follows in 1-3 business days.

NoNotes has been used extensively in research applications. I have communicated with the Director of Business Development at NoNotes, and he has by email confirmed the information below.

How secure is NoNotes?
We use 128bit SSL Encryption. Our passwords are doubled hashed and only Internal NoNotes staff have access when transcription permission is granted. All our servers are located in class-A facility with climate control, retinal scan access and around the clock security.

How do you ensure transcription confidentiality?
All of our transcriptionists have signed confidentiality agreements as part of their employment contracts. We also have a standard Non-Disclosure Agreement (NDA) that we activate or we will sign any NDA that you wish to put in place. We are also happy to sign any additional legal information that you might have.

My first interview is scheduled for November 6, 2015, so I am requesting your expedited approval. Thank you for your consideration.
MEMORANDUM

TO: Dr. Dawn Basinger and Ms. Laura Bostick
FROM: Dr. Sum Nappier, Vice President Research & Development
SUBJECT: HUMAN USE COMMITTEE REVIEW
DATE: November 11, 2015

In order to facilitate your project, an EXPEDITED REVIEW has been done for your proposed study entitled:

"Implementing the Unified English Braille Code in Louisiana: Perspectives of Teachers of Students with Visual Impairments"
HUC 1364

The proposed study’s revised procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be personal in nature or implications. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Informed consent is a critical part of the research process. The subjects must be informed that their participation is voluntary. It is important that consent materials be presented in a language understandable to every participant. If you have participants in your study whose first language is not English, be sure that informed consent materials are adequately explained or translated. Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

Projects should be renewed annually. This approval was finalized on November 11, 2015 and this project will need to receive a continuation review by the IRB if the project, including data analyses, continues beyond November 11, 2016. Any discrepancies in procedures or changes that have been made including approved changes should be noted in the review application. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of University Research.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researchers responsibility to notify the Office of Research or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

If you have any questions, please contact Dr. Dr. Mary Livingston at 257-2292 or 257-5066.
HUMAN SUBJECTS CONSENT FORM

The following is a brief summary of the project in which you are asked to participate. Please read this information before signing the statement below.

TITLE OF PROJECT: Implementing the Unified English Braille Code in Louisiana: Perspectives of Teachers of Students with Visual Impairments

PURPOSE OF STUDY/PROJECT: The purpose of this study is to evaluate the concerns of teachers of students with visual impairments (TVIs) regarding the transition to Unified English Braille (UEB) and to determine their current use of UEB in order to guide the implementation plan, the training content, and the development of materials and instructional strategies for teaching UEB.

PROCEDURE: Approximately 75 teachers of students with visual impairments (TVIs) in the state of Louisiana solicited from a statewide email distribution list will voluntarily complete an online packet of self-report inventories regarding their reactions, feelings, perceptions, and attitudes about the transition to Unified English Braille. Inventories will include a stages of concern questionnaire (SoCQ), an open-ended concern statement (oeSoC), and demographic information. 10-12 teachers who express willingness to be interviewed will be interviewed regarding their current use of Unified English Braille using the levels of use interview protocol. Interview recordings will be transcribed by a professional transcription service that has a privacy statement and a confidentiality agreement in place. Data will then be analyzed to determine the relationship among these variables.

INSTRUMENTS: A 35-item Stages of Concern Questionnaire (online) and open-ended concern statement developed by Gene Hall will be used to evaluate TVIs' reactions, feelings, perceptions, and attitudes about the transition to Unified English Braille. Demographic information will be collected as part of the survey. The Levels of Use Interview Protocol developed by Gene Hall will be used to describe how TVIs are currently using Unified English Braille. All collected information will be held confidential and only viewed by the researchers. Information on teachers' participation or nonparticipation in the study will be held confidential and not shared with school administrators.

RISKS/ALTERNATIVE TREATMENTS: The participant understands that Louisiana Tech is not able to offer financial compensation nor to absorb the costs of medical treatment should you be injured as a result of participating in this research.

The following disclosure applies to all participants using online survey tools: This server may collect information and your IP address indirectly and automatically via “cookies”.

BENEFITS/COMPENSATION: None.

I, ____________________________, attest with my signature that I have read and understood the following description of the study, "Implementing the Unified English Braille Code in Louisiana: Perspectives of Teachers of Students with Visual Impairments," and its purposes and methods. I understand that my participation in this research is strictly voluntary and my participation or refusal to participate in this study will not affect my relationship with Louisiana Tech University or my grades in any way. Further, I understand that I may withdraw at any time or refuse to answer any questions without penalty. Upon completion of the study, I understand that the results will be freely available to me upon request. I understand that the results of my survey will be confidential, accessible only to the principal investigators, myself, or a legally appointed representative. I have not been requested to waive nor do I waive any of my rights related to participating in this study.

Signature of Participant or Guardian Date
APPENDIX H

REQUEST FOR PARTICIPATION AND REMINDER EMAILS
Original Request for Participation Email

Sent: September 28, 2015
Subject: Survey for TVIs in Louisiana on Transition to UEB

Dear Colleague,

My name is Laura Bostick, and I’m an instructor in the Teaching Blind Students program at Louisiana Tech University. I’m also the mother of a blind daughter who is a braille reader. I’m currently in a doctoral program, and for my dissertation, I’m investigating the concerns of teachers of students with visual impairments (TVIs) regarding the transition to Unified English Braille (UEB).

A smooth transition to UEB will require an understanding of the needs of those most affected. As a TVI, that means you. You are essential to the success of our blind and visually impaired students. By identifying the concerns of TVIs and the supports that they need, recommendations can be made to guide the implementation plan, the training content, and the development of materials and instructional strategies for teaching UEB.

Absolutely key to my study is information only you, as a TVI, can provide. Would you please consider filling out the short online survey linked below? It will take no more than ten minutes to complete.

The survey is available online at: https://www.sedl.org/concerns/index.cgi?sc=mvt7ig

Please complete the survey at your earliest convenience. The survey will close 10 days from now on October 8, 2015.

After completing the questionnaire, you will be given the opportunity to sign up to participate in a short interview at a later date; however, it is not required, and your questionnaire is valuable whether or not you participate in an interview. The interview will take approximately 15-20 minutes, and it can be conducted in person, by phone, or online.

Privacy information: I have the approval of Louisiana Tech’s Institutional Review Board (IRB) to conduct this study. You are not required to leave any identifying information. All collected information will be held confidential.

If you have any questions, please contact me.

Most gratefully,

Laura Bostick, M.A.Ed.
Doctoral Candidate
Louisiana Tech University
318-257-4554
lbostick@latech.edu
Reminder Email #1

Sent: October 05, 2015
Subject: Please Help - More TVI Responses Needed for Survey on Transition to Unified English Braille

Dear Colleague,

This email is a renewed request that you complete a short online survey for a study I am conducting regarding teachers' concerns about the transition to Unified English Braille. You, as a TVI, are at the center of this transition, and only you can provide the information I am seeking.

To those of you who have already completed the survey, thank you so much! The information you provided is invaluable, and I truly appreciate your participation.

But more responses are needed, so if you have not yet completed a survey, will you please, please consider doing so now?

- The survey takes less than 10 minutes to complete.
- Any TVI in Louisiana who currently has at least one blind/visually impaired student is eligible to participate, and you need not have completed your VI certification.
- I need information from teachers at all levels of UEB training and use – from those who have not yet received any training to those who are already using UEB with their students.
- Your response is completely anonymous.

The survey is available online at:
https://www.sedl.org/concerns/index.cgi?sc=mvt7jg

The survey will close on Saturday, October 10, 2015, but don’t wait! Please take a few minutes to respond now, if you can.

After completing the questionnaire, you will be given the opportunity to sign up to participate in a short interview at a later date. The interview will take approximately 15-20 minutes, and it can be conducted in person, by phone, or online. Please note that the interview is not required, and your questionnaire is valuable whether or not you participate; however, an interview can provide crucial information that cannot be obtained through a survey.
If you want to know more about me and my research study, you can find my original request for participation below. Please feel free to call or email me with any questions you may have.

Thanks so much!

Laura Bostick, M.A.Ed.
Doctoral Candidate
Louisiana Tech University
318-257-4554
lbostick@latech.edu

P.S. I apologize in advance to those who have or will receive this note more than once. There is overlap on email distribution lists, but in order to reach all the TVIs in Louisiana, I’ve asked that it be sent out on the three main LA TVI lists – LSVI, LIMC, and LCB.

Reminder Email #2

Sent: October 13, 2015
Subject: UEB Transition Study: Thank You and Request for Interviews

Dear Colleagues,

Thank you so much to everyone who responded to my survey on the transition to Unified English Braille! I truly appreciate your taking the time to participate.

If you completed the survey but did not sign up for an interview, would you please consider doing so now? I really need your help - just a few more interviews would make a very big difference in my study.

- Previous training and experience with UEB is not required – the purpose of the interview is to explore how you are using UEB or plan to use UEB with your students during this transition period and how you stay informed about new trends and issues in the field.
- Your interview will remain completely anonymous. No identifying information – including the fact that you gave an interview – will ever be shared.
- The interview will take approximately 15-20 minutes, and it can be conducted in person, by phone, or online.
- I will schedule a time that is convenient for you.
- Your contact information will be used only for the purpose of setting up the interview, and it will never be shared.
You can sign up for an interview by leaving your contact information at:
https://www.surveymonkey.com/r/CW36SX2

If you have any questions, or if you’d like to speak to me about the interview, I can be reached at lbostick@latech.edu or at 318-257-4554.

Sincerely,

Laura Bostick, M.A.Ed.
Doctoral Candidate
Louisiana Tech University
318-257-4554
lbostick@latech.edu
APPENDIX I

SOCQ QUICK SCORING DEVICE
Stages of Concern Quick Scoring Device

The Quick Scoring Device can be used to hand score the Stages of Concern Questionnaire (SoCQ) responses and to plot an individual profile. It is especially useful when only a small number of questionnaires need to be processed or when computer processing is not available. By following the step-by-step instructions, the SoCQ responses are transferred to the device, entered into seven scales, and each scale is totaled. Then the seven raw scale score totals are translated into percentile scores and plotted on a grid to produce the individual's SoCQ profile.

Instructions
1. In the box labeled A, fill in the identifying information taken from the cover sheet of the SoCQ.
2. In the table labeled B on the Scoring Device, transcribe each of the 35 SoCQ circled responses from the questionnaire (raw data). Note that the numbered blanks are not in consecutive order.
3. Row C contains the Raw Scale Score Total for each stage (0-6). Take each of the seven columns (0-6) in Table B, add the numbers within each column, and enter the sum of each column (0-6) in the appropriate blank in Row C. Each of these seven Raw Scale Score totals is a number between 0 and 35.
4. Table D contains the percentile scores for each Stage of Concern. For example, find the Raw Scale Score Total for Stage 0 from Row C ("12" from the example) in the left-hand column in Table D, then look in the Stage 0 column to the right in Table D and circle that percentile rank ("69" in the example). Take the raw score for Stage 1 ("31" in the example) to Table D and locate that numeral in the left-hand Raw Score Total column. Move across in the percentile table to the Stage 1 column and circle the percentile value ("98" in the example). Do the same for Stages 2 through 6.
5. Transcribe the circled percentile scores for each stage (0-6) from Table D to Box E. Box E now contains seven numbers between 0 and 99.
6. Box F contains the SoCQ grid. From Box E, take the percentile score for Stage 0 ("69" in the example) and mark that point with a dot on the Stage 0 vertical line of the SoCQ grid. Do the same for Stages 1-6. Connect the points to form the SoCQ profile.

You can now check your own scoring by using the blank profile sheet (see Appendix C). You will want to make copies of the blank scoring device before writing on it. Reproduce the data in the example by recording the original data from the completed SoCQ.
Stages of Concern Quick Scoring Device

<table>
<thead>
<tr>
<th>Stage</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C

E

F

Concerns Based Systems International

Southwest Educational Development Laboratory
Source: George et al., 2006, pp. 85–86, 91
The LoU Rating Sheet

LEVEL OF USE RATING SHEET (CBAM, 1975)

Tape #: Date: / / 
Site: I.D. #: Interviewer: Rater:

<table>
<thead>
<tr>
<th>Level</th>
<th>Knowledge</th>
<th>Acquiring Information</th>
<th>Sharing</th>
<th>Assessing</th>
<th>Planning</th>
<th>Status Reporting</th>
<th>Performing</th>
<th>Overall LoU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonuse</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Decision Point A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Decision Point B</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>Preparation</td>
<td>II</td>
<td>II</td>
<td>II</td>
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<tr>
<td>Decision Point C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Use</td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>III</td>
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<td>III</td>
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<tr>
<td>Decision Point D-1</td>
<td>IVA</td>
<td>IVA</td>
<td>IVA</td>
<td>IVA</td>
<td>IVA</td>
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<tr>
<td>Routine</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision Point D-2</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
</tr>
<tr>
<td>Refinement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision Point E</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
<td>IVB</td>
</tr>
<tr>
<td>Integration</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Decision Point F</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
</tr>
<tr>
<td>Renewal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User is not doing:</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td></td>
</tr>
<tr>
<td>No Information in Interview:</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td></td>
</tr>
</tbody>
</table>

Is the individual a past user? Yes No If so, what was their last LoU? __________

How much difficulty did you have in assigning this person to a specific LoU? None 1 2 3 4 5 6 7 Very much

Comments about interviewer —

General comments—

Source: Hall et al., 2006, p. 57
APPENDIX K

LOU OF THE INNOVATION CHART
Levels of Use (LoU) of the Innovation

<table>
<thead>
<tr>
<th>SCALE POINT</th>
<th>Acquiring Information</th>
<th>Knowledge</th>
<th>Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DECISION POINT A</td>
<td>Takes action to learn more detailed information about the innovation.</td>
<td>That which the user knows about the innovation and its characteristics.</td>
<td>Discusses the innovation with others.</td>
</tr>
<tr>
<td>DECISION POINT B</td>
<td>Takes action to learn more detailed information about the innovation.</td>
<td>Discusses the innovation in general terms and/or exchanges descriptive information, materials, or ideas about the innovation and possible implications of its use.</td>
<td></td>
</tr>
<tr>
<td>DECISION POINT C</td>
<td>Changes made are dominated by user needs. Clients may be involved, however, management, time, or limited experimental knowledge dictate what the user does.</td>
<td>Changes to use and use are dominated by user needs. Clients may be involved, however, management, time, or limited experimental knowledge dictate what the user does.</td>
<td></td>
</tr>
<tr>
<td>DECISION POINT D-1</td>
<td>A routine pattern of use is established. Changes are made routinely, but there are no recent changes outside the pattern.</td>
<td>A routine pattern of use is established. Changes are made routinely, but there are no recent changes outside the pattern.</td>
<td></td>
</tr>
<tr>
<td>DECISION POINT D-2</td>
<td>Changes in use of the innovation based on formal or informal evaluation in order to increase client outcomes. The changes must be recent.</td>
<td>Changes in use of the innovation based on formal or informal evaluation in order to increase client outcomes. The changes must be recent.</td>
<td></td>
</tr>
<tr>
<td>DECISION POINT E</td>
<td>Initiates changes in use of innovation based on input of and in coordination with what colleagues doing.</td>
<td>Initiates changes in use of innovation based on input of and in coordination with what colleagues doing.</td>
<td></td>
</tr>
<tr>
<td>DECISION POINT F</td>
<td>Begins exploring alternatives or major modifications to the innovation presently in use.</td>
<td>Begins exploring alternatives or major modifications to the innovation presently in use.</td>
<td></td>
</tr>
</tbody>
</table>

**SCALE POINT Definitions of the Levels of Use of the Innovation**

Knowledge:
- That which the user knows about the innovation and its characteristics.
- The cognitive knowledge related to using the innovation, not feelings or attitudes.
- Changes to use and use are dominated by user needs. Clients may be involved, however, management, time, or limited experimental knowledge dictate what the user does.

Acquiring Information:
- Takes action to learn more detailed information about the innovation.
- Discusses the innovation with others.
- Shares plans, ideas, resources, outcomes, and problems related to use of the innovation.

Sharing:
- Takes action to learn more detailed information about the innovation.
- Discusses the innovation in general terms and/or exchanges descriptive information, materials, or ideas about the innovation and possible implications of its use.
- Changes made are dominated by user needs. Clients may be involved, however, management, time, or limited experimental knowledge dictate what the user does.

**CATEGORIES:**
- DECISION POINT A
- DECISION POINT B
- DECISION POINT C
- DECISION POINT D-1
- DECISION POINT D-2
- DECISION POINT E
- DECISION POINT F
<table>
<thead>
<tr>
<th>ASSESSING</th>
<th>PLANNING</th>
<th>STATUS REPORTING</th>
<th>PERFORMING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examines the potential or actual use of the innovation or some aspect of it. This can be a mental assessment or can involve actual collection and analysis of data.</td>
<td>Designs and defines short- and/or long-range steps to be taken during process of innovation adoption, i.e., plans resources, schedules, and activities, and meets with others to organize and coordinate use of the innovation.</td>
<td>Describes personal stance at the present time in relation to use of the innovation.</td>
<td>Carries out the actions and activities entailed in operationalizing the innovation.</td>
</tr>
<tr>
<td>Takes no action to analyze the innovation as a whole or determine use, potential outcomes, strengths, and weaknesses or against use of the innovation required for use, evaluation reports, resources as needed to make a decision on or against use of the innovation.</td>
<td>Schedules time and specifies no steps for the study or use of the innovation.</td>
<td>Reports little or no personal involvement with the innovation.</td>
<td>Takes no discernible action toward learning about or using the innovation. The innovation and/or its accomplishments are not present or in use.</td>
</tr>
<tr>
<td>Analyzes and compares materials, content, requirements for use, evaluation reports, potential outcomes, strengths, and weaknesses for purposes of making a decision about use of the innovation.</td>
<td>Plans to gather necessary information and resources needed to make a decision for or against use of the innovation.</td>
<td>Reports presently inverting self to what the innovation is and is not.</td>
<td>Explores the innovation and requirements for its use by talking to others about it, reviewing descriptive information and sample materials, attending orientation sessions, and observing others using it.</td>
</tr>
<tr>
<td>Analyzes detailed requirements and available resources for initial use of the innovation.</td>
<td>Identifies steps and procedures entailed in obtaining resources and organizing activities and events for initial use of the innovation.</td>
<td>Reports preparing self for initial use of the innovation.</td>
<td>Studies reference materials in depth, organizes resources and logistics, and schedules and receives skill training in preparation for initial use.</td>
</tr>
<tr>
<td>Examines own use of the innovation with respect to problems of logistics, management, time, schedules, resources, and general reactions of clients.</td>
<td>Plans short-term and long-range actions with little projected variation in how the innovation will be used. Plans for organizing and managing resources, activities, and events related primarily to immediate ongoing use of the innovation. Plans for changes address managerial or logistical issues with a short-term perspective.</td>
<td>Reports that logistics, time, management, resource organization, etc., are the focus of most personal efforts to use the innovation.</td>
<td>Manages the innovation with varying degrees of efficiency. Often lacks anticipates of immediate consequences. The flow of actions in the user and clients is often disjointed, uneven, and uncertain. When changes are made, they are primarily in response to logistical and organizational problems.</td>
</tr>
<tr>
<td>Limits evaluation activities to those administratively required, with little attention paid to findings for the purpose of changing use.</td>
<td>Plans intermediate and long-range actions with little projected variation in how the innovation will be used. Planning focuses on routine use of resources, personnel, etc.</td>
<td>Reports that personnel use of the innovation is going along satisfactorily.</td>
<td>Uses the innovation smoothly with minimal management problems, over time there is little variation in pattern of use.</td>
</tr>
<tr>
<td>Assesses use of the innovation for the purpose of changing current practices to improve client outcomes.</td>
<td>Develops intermediate and long-range plans that anticipate possible and needed steps, resources, and events designed to enhance client outcomes.</td>
<td>Reports varying use of the innovation in order to change client outcomes.</td>
<td>Explores and experiments with alternative combinations of the innovation with existing practices to maximize client involvement and to optimize client outcomes.</td>
</tr>
<tr>
<td>Appraises collaborative use of the innovation in terms of client outcomes and strengths and weaknesses of the integrative effort.</td>
<td>Plans specific actions to coordinate own use of the innovation with others to achieve increased impact on clients.</td>
<td>Reports spending time and energy collaborating with others about integrating own use of the innovation.</td>
<td>Collaborates with others in use of the innovation as a means for expanding the innovation's impact on clients. Changes in use are made in coordination with others.</td>
</tr>
<tr>
<td>Analyzes advantages and disadvantages of major modifications or alternatives to the present innovation.</td>
<td>Plans activities that involve pursuit of alternatives to enhance or replace the innovation.</td>
<td>Reports considering major modifications or alternatives to present use of the innovation.</td>
<td>Explores other innovations that could be used in combination with or in place of the present innovation in an attempt to develop more effective means of achieving client outcomes.</td>
</tr>
</tbody>
</table>

Source: Hall et al., 2006, pp. 72–73
APPENDIX L

OPEN-ENDED CONCERNS STATEMENTS
OPEN-ENDED CONCERNS STATEMENTS

<table>
<thead>
<tr>
<th>#</th>
<th>Statement</th>
<th>Theme(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I am mostly concerned about teaching the old code and the new code to those who have not mastered the old code as of yet.</td>
<td>ability (students)</td>
</tr>
<tr>
<td>2.</td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>I have only learned UEB so the transition is not something I am concerned with now.</td>
<td>no concern</td>
</tr>
<tr>
<td>4.</td>
<td>My only concern is the timely availability of UEB materials. I am primarily concerned about the need to be able to read both UEB and the previous system and to accurately write UEB. This may be challenging for less capable students.</td>
<td>materials ability (students)</td>
</tr>
<tr>
<td>5.</td>
<td>UEB math!!!</td>
<td>math</td>
</tr>
<tr>
<td>6.</td>
<td>I am concerned that our state may adopt UEB MATH in the future, and I think Nemeth is more efficient for higher order math.</td>
<td>math</td>
</tr>
<tr>
<td>7.</td>
<td>That TVIs throughout the state will not be exposed to proper training, thus not allowing for proper training of students.</td>
<td>training (self/teacher)</td>
</tr>
<tr>
<td>8.</td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>I am not concerned about the use of UEB. My students either are learning UEB from the start if a new braille learner or have learned both old braille and new UEB if they have been receiving services for longer than one year.</td>
<td>no concern</td>
</tr>
<tr>
<td>10.</td>
<td>I am concerned that the classroom teachers do not have time to help the braille readers transition to UEB and that they do not know how to teach UEB to the students. Teachers use me for a reference and I have led introductions to it, but think at our school, we need to make time to learn ways to teach it within the subjects a teacher teaches.</td>
<td>time training (self/teacher)</td>
</tr>
<tr>
<td>11.</td>
<td>As long as [my state] keeps Nemeth for math, I have no concerns</td>
<td>math</td>
</tr>
<tr>
<td>12.</td>
<td>I feel that there should have been more information/workshops concerning the changes prior to the implementation of UEB. I always feel that we have to ‘catch-up’ to the changes.</td>
<td>training (self/teacher)</td>
</tr>
<tr>
<td>13.</td>
<td>Older materials that do not have the UEB code and making sure the student is up to date with both codes</td>
<td>ability (students)</td>
</tr>
<tr>
<td>14.</td>
<td>Preparing my students to function in life.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Changing the resources readily available that I already have.</td>
<td>materials</td>
</tr>
<tr>
<td>16.</td>
<td>I have no concerns. I think the UEB code changes were necessary and make a lot of sense.</td>
<td>no concern</td>
</tr>
<tr>
<td>17.</td>
<td>My ability to make the transition.</td>
<td>ability (self/teacher)</td>
</tr>
</tbody>
</table>
I am not concerned. My students are young so they are emerging braille readers and have not had a problem with any changes. I just address the changes as they appear in their reading and writing and we move on. Truly this is not a big deal and if we approach it as just simple changes our students will not have a problem.

In transitioning to UEB, I am concerned about the confusion that is sure to come about since there will still be reading materials containing the old Braille code in circulation. So then, the Braille reader will have to constantly remind him/herself which code is which. It will also be challenging to the student learning Braille for the very first time. Since these old Braille books are still in circulation, it will still be necessary for the student to be familiar with the old as well as the new Braille code (UEB). Another area that concerns me is that I have been told that each state will have the option of deciding whether to use UEB or Nemeth Code for Math and Science. Heaven help the child who moves from one state where one system is being used to another state where another system is being used. There must be uniformity. Otherwise, it is a set up for failure.

My main concern is learning it myself so that I can teach it to others. I have slowly been implementing changes as I learn them to show my high school student who has been using BANA braille since she learned to read. I'm concerned for her reading it and using it.

There are no concerns at this time. The format and grouping of the word signs, contractions, etc. should aid the student(s) in comprehending the codes. Therefore, the transition should be smooth.

My biggest issue is the phasing out of literary braille. I would like to know if there will be a way to know when I can stop all teaching literary reading AND UEB reading/writing. It is almost as if I have to teach three codes on top of Nemeth, music braille, and all of the extended core curriculum.

I don't have any concerns other than just making sure I am accurate in my teaching of UEB. I [am] very pleased that my district purchased an embosser. That has helped me be able to monitor my teaching. This survey was very confusing since UEB is already in place. It sounded as though someone is trying NOT to use UEB. It was not a very professional [survey] because the questions were very 'leading'. Sorry, just my opinion. I've been teaching regular education many years, and have never completed a survey that was quite so manipulative.
25. I am not leery of the changes. They seem to make sense and clarify items that were confusing.

26. I don’t know UEB and I don’t have time to learn something new.

I am concerned that UEB math will supplant Nemeth here in the U.S. UEB is necessary for the evolving literary climate but should not serve as a substitute to the tried and true flexibility and power of Nemeth for mathematics and science texts.

27. I am concerned about not having enough time to learn UEB and meet the needs of my students at the same time.

28. NR

29. Being able to remember all the changes.

30. UEB is all I know because I am so new to this. I took Braille 1 and 2 which was given in UEB. I feel lucky!

31. I am concerned about the transition my students will have to make when UEB is used in their textbooks.

Students using textbooks Brailled before the transition to UEB, while learning UEB. The amount of time it will take to learn UEB, is a concern.

Finding materials that have been converted [is a concern], too, but

32. I can produce them or talk to my students when they find a differences.
APPENDIX M

CONCERNS AND THE FACILITATION OF CHANGE
A first step in using concerns to guide interventions is to know what concerns the individuals have, especially their most intense concerns. The second step is to deliver interventions that might respond to those concerns. Unfortunately, there is no absolute set of universal prescriptions, but the following suggestions offer examples of interventions that might be useful.

Stage 0 - Unconcerned

a. If possible, involve teachers in discussions and decisions about the innovation and its implementation.
b. Share enough information to arouse interest but not so much that it overwhelms.
c. Acknowledge that a lack of awareness is expected and reasonable and that no questions about the innovation are foolish.
d. Encourage unaware persons to talk with colleagues who know about the innovation.
e. Take steps to minimize gossip and inaccurate sharing of information about the innovation.

Stage 1 - Informational Concerns

a. Provide clear and accurate information about the innovation.
b. Use a variety of ways to share information—verbally, in writing, and through any available media. Communicate with individuals and with small and large groups.
c. Have persons who have used the innovation in other settings visit with your teachers. Visits to other schools could also be arranged.
d. Help teachers see how the innovation relates to their current practices, both in regard to similarities and differences.
e. Be enthusiastic and enhance the visibility of others who are excited.

Stage 2 - Personal Concerns

a. Legitimize existence and expression of personal concerns. Knowing these concerns are common and that others have them can be comforting.
b. Use personal notes and conversations to provide encouragement and reinforce personal adequacy.
c. Connect these teachers with others whose personal concerns have diminished and who will be supportive.
d. Show how the innovation can be implemented sequentially rather than in one big leap. It is important to establish expectations that are attainable.
e. Do not push innovation use but encourage and support it while maintaining expectations.
Stage 3 - Management Concerns

a. Clarify the steps and components of the innovation. Information from innovation configurations will be helpful here.
b. Provide answers that address the small specific “how-to” issues that are so often the cause of management concerns.
c. Demonstrate exact and practical solutions to the logistical problems that contribute to the concerns.
d. Help teachers sequence specific activities and set timelines for their accomplishments.
e. Attend to the immediate demands of the innovation not what will be or could be in the future.

Stage 4 - Consequence Concerns

a. Provide these individuals with opportunities to visit other settings where the innovation is in use and to attend conferences on the topic.
b. Don’t overlook these individuals. Give them positive feedback and needed support.
c. Find opportunities for these persons to share their skills with others.
d. Share with these persons information pertaining to the innovation.

Stage 5 - Collaborative Concerns

a. Provide these individuals with opportunities to develop those skills necessary for working collaboratively.
b. Bring together those persons, both within and outside the school, who are interested in collaboration.
c. Help the collaborators establish reasonable expectations and guidelines for the collaborative effort.
d. Use these persons to provide technical assistance to others who need assistance.
e. Encourage the collaborators, but don’t attempt to force collaboration on those who are not interested.

Stage 6 - Refocusing Concerns

a. Respect and encourage the interest these persons have for finding a better way.
b. Help these individuals channel their ideas and energies in ways that will be productive rather than counterproductive.
c. Encourage these individuals to act on their concerns for program improvement.
d. Help these persons access resources they may need to refine their ideas and put them into practice.
e. Be aware of and willing to accept the fact that these persons may replace or significantly modify the existing innovations.

Source: Hord et al., 2006, pp. 44–46
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